4-28 (1)

OUIII AR576

Program Directive

MMTS - OU III **Program/Project** **Directive No.** MSG-00-01

Task Order No. MAC00-03 (Task No. 342002006)

Initiated By: Tim Bartlett, Field Supervisor, MACTEC-ERS

Directive Subject: Collection of samples and field measurements from specified PeRT well locations.

Justification and Associated New Task Changes: Additional data is needed to prepare for discussions with the regulators (UDEQ and EPA) at a technical meeting in early April. The meeting will take place prior to the next scheduled quarteiy sampling round.

Organization(s) Affected: Field sampling personnel and GJO Analytical Laboratory

Affected Documents:

MMTS, OU III, Interim Remedial Action Surface Water and Ground Water Monitoring Plan, Rev. 3, December 1999 (MAC-MSGRAP 1.3.5-1)

Directive: (1) Collect water samples from the following 13 PeRT well locations in accordance with the standard procedures and practices identified in the monitoring plan. Sample Locations: R6-M2, R6-M3, R7-M2, T6-S, T6-D, T7-D, R6-M4, R6-M5, R7-M1, R8-M1, R9-M1, R10-M1, and R11-M1. Analytes for all samples collected will include metals, anions, cations, nitrate, Fe and Mn. Well purging and field parameter measurements (temperature, conductivity, pH, ORP, DO, turbidity, and alkalinity) will be obtained according to the plan.

(2) Obtain water level measurements at all sampled locations, the following upgradient alluvial wells R1-M1, R1-M2, R1-M3, T1-S, T1-D, R1-M4, R1-M5, and R1-M6 and the following mid-wall wells R4-M1, R4-M2, R4-M3, R4-M4, T4-S, T4-D, R4-M5, R4-M6, R4-M7, and R4-M8.

Review and Concurrence:

Kristen McClellen

Kristen McClellen, OU III Project Manager

Task Order Manager Approval to Issue:

Mike Butherus, Manager, Major Projects

Effective Date: February 28, 2000 **Expiration Date:** April 10, 2000

Distribution: w/ Attachments
Task Order Managers Directive Log
Jalane Glasgow - Record File MSG 1.14
Holders of all affected documents
Cathy Kelleher (2 copies) - Project Administrative Record

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MRAP OUIII AR 576 4-21 PROGRAM DIRECTIVES
MSGRAP DIRECTIVES OUIII – 16 DOCUMENTS ON
CHANGE OF DIRECTION 2000-2003

Program Directive

MMTS - OU III / PeRT **Program/Project** **Directive No.** MSG 00-02

Task Order No. MAC00-03 (Task No. 301508001)

Initiated By: Tim Bartlett, Field Supervisor, MACTEC-ERS

Directive Subject: This directive is being issued to modify PeRT Wall water sample and measurement locations, increase the number of analytes at selected sample locations, and direct the collection of additional sample volume, for microbial study, at 4 locations. Additionally, the directive modifies the requirements for logbook documentation.

Justification and Associated New Task Changes: (1) Two additional PeRT wells (R7-M2 and T7-D) were installed for inclusion in the sampling program. (2) Additional analytical information is needed to evaluate the performance of the PeRT Wall. (3) To assist with the microbial research being conducted by Dr. Sonja Selenska-Pobell additional sample volume is needed from 4 wells. (4) Field data sheets have been modified to include the general logbook information.

Organization(s) Affected: Field sampling personnel, GJO Analytical Laboratory, and GJO Environmental Laboratory personnel.

Affected Documents:

MMTS, OU III, Interim Remedial Action Work Plan, (Draft) May 1999, (MAC-MSG 2.2.4)

MMTS, OU III, Interim Remedial Action Surface Water and Ground Water Monitoring Plan, Rev. 2, July 1999 (MAC-MSGRAP 1.3.5-1)

Directive:

(1) Wells R7-M2 and T7-D and piezometer s PW-17 and PW-11 were installed in January and February and are to be included in the regularly scheduled quarterly sampling events. The analytes for R7-M2 and T7-D are the same as specified for R6-M3 and T6-S and T6-D. Metals is the only analyte for locations PW-17 and PW-11, which is consistent with the near-by R6-M1 and R1-M1 PeRT wells. Water-level measurements and sampling protocols will be completed per the plan.

(2) Nitrite (NO_2 as N) and Ammonium (NH_4) are to be collected in addition to the analyte list specified in the plan at the following locations. Requirements for sample containers, preservation, and holding times are listed below.

R1–M2	R1–M3	T1–S / T1–D	R1–M4	R7–M1
R2–M2	R2–M4	T2–S / T2–D	R2–M7	R8–M1
R3–M1	R3–M2	T3–S / T3–D	R3–M3	R9–M1
R4–M1	R4–M3	T4–S / T4–D	R4–M6	R10–M1
R5–M2	R5–M4	T5–S / T5–D	R5–M7	R11–M1
R6–M2	R6–M3	T6–S / T6–D	R6–M4	
	R7–M2	T7–D		

Directive: (continued)

Sample Requirements:

Parameters	Containers	Preservation	Holding Times
Nitrite (NO_2 as N)	125ml HDPE	Filtered by 0.45 µm filter Cool to 4° C	48 hours
Ammonium	125ml HDPE	Filter by 0.45 µm filter Cool 4° C, H_2SO_4 pH < 2	28 days

These aliquots (NO_2 and NH_4 are to be collected after the specified analytes (at these locations) listed in the plan have been obtained, i.e., metals/cations, anions NO_3, then Nitrite and Ammonium. They will be collected under the same ticket number as the sample for the location.

Due to the short holding time (48 hrs.) for NO_2 sample aliquots, the GJO Laboratory has asked that the Chain-of-Sample Custody be faxed to them before leaving the site in order to expedite sample receipt.

(3) Water samples, for microbial study, are to be collected and returned to Grand Junction on 4/11/00 from the following locations: 88-85, R4-M1, R5-M2 and R9-M1. Location R10-M1 will be substituted for R9-M1 if R9-M1 has insufficient well recovery. The samples will be collected unfiltered and with no headspace in 3 - 500ml sterile bottles. The sample volumes will be immediately placed in ice in a container separate from that of the OUIII and PeRT Wall samples. The Environmental Sciences Laboratory personnel will make arrangements for sample bottles, containers, and transportation of the samples back to Grand Junction. This is a one time only task to the April 2000 scheduled sampling event.

(4) Logbooks will no longer be required for information documented on the field data sheets. Field data sheets have been modified and include the information typically documented in the field logbook. Logbooks will be available to field personnel and will continue to be used to record trip events of a general nature, site visitors, stream-flow information, drilling and abandonment information, etc.

Review and Concurrence:

Kristen McClellen, OU III Project Manager

3/30/2000
Clay Carpenter, PeRT Technical Support Manager

Stan Morrison, Manager, Environmental Sciences Laboratory

Task Order Manager Approval to Issue:

3/31/00
Mike Butherus, Manager, Major Projects

Effective Date: April 10, 2000

Expiration Date: September 30, 2000

Distribution: w/ Attachments
Task Order Managers Directive Log
Jalane Glasgow - Record File MSG 1.14
Dennis DuPont - Record File PTW 2.4.1
Holders of all affected documents
Cathy Kelleher (2 copies) - Project Administrative Record

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4-20 (3)

OUIII AR 576

Program Directive

MMTS - OU III /PeRT **Program/Project** **Directive No.** MSG-00-03

Task Order No. MAC00-03 (Task No. 341508001)

Initiated By: Tim Bartlett, Field Supervisor, MACTEC-ERS

Directive Subject: Modifications to the OU III / PeRT April 2000 water sampling event.

Justification and Associated New Task Changes: (1) Agreements reached with regulators (UDEQ and EPA) following the on-site visit April 4, 2000 regarding surface water and ground water sampling locations. (2) Clarification by the GJO Laboratory on sample volumes and combining NO_3, NO_2, and Anion aliquots.

Organization(s) Affected: Field sampling personnel and GJO Analytical Laboratory

Affected Documents:

MMTS, OU III, Interim Remedial Action Surface Water and Ground Water Monitoring Plan, Rev. 3, December 1999 (MAC-MSGRAP 1.3.5-1)

Directive: Changes to OU III sample locations and clarification to PeRT analyte aliquots.

(1) OU III: Modification to Surface Water Locations.

a. Discontinue sampling at locations SW95-01, SW92-09, SW92-07 and SW92-06
b. Establish and sample at the following new locations along Montezuma Creek: SW00-01 at the HWY 192 culvert, SW00-02 at the east end of the Millsite, and SW00-03 below the weir west of location SW92-06.
c. Sample location SW99-04 a little to the west at the large flat rock location.
d. Collect a filtered metals sample and a 1-liter unfiltered isotopic "U" (U-234 and U-238 by GJO Method RC-19) sample at the deer seeps/ponds (as available) on the southeast Millsite hillsides as discussed in the field.
e. Stream flow measurements will be obtained at each of the new SW locations and the relocated SW99-04.

(2) OU III: Modification to Ground Water Locations

a. Add Near South Site wells 31SW93-197-2 through 31SW93-197-5 to the well list. Collect filtered metals and isotopic "U" samples at locations 197-3 and 197-5. Measure water levels at the remaining wells i.e., 197-2 and 197-4.

(3) PeRT: wells being sampled for Nitrite (NO_2 as N) may combine Anions and Nitrate (NO_3 as N) in the same 125ml bottle. Sample tickets and labels should identify the analytes as NO_2 as N, NO_3 as N, and Anions. When sampling is completed from wells requiring Nitrite analyses the Nitrogen analysis will return to that specified in the plan i.e., Nitrate ($NO_3 + NO_2$ as N) and anions will be collected separately.

Review and Concurrence:

Kristen McClellen

Kristen McClellen, OU III Project Manager

Task Order Manager Approval to Issue:

4/7/00

Mike Butherus, Manager, Major Projects

Effective Date: April 10, 2000 **Expiration Date:** September 30, 2000

Distribution: w/ Attachments
Task Order Managers Directive Log
Jalane Glasgow - Record File MSG 1.14
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4-20 (4)

OU III AR 576

Program Directive

MMTS - OU III / PeRT **Program/Project** **Directive No.** MSG-00-04

Task Order No. MAC00-03 (Task No. 341508001) / MAC00-12 (Task No. 342002006)

Initiated By: Tim Bartlett, Field Supervisor, MACTEC-ERS

Directive Subject: Modifications to the OU III / PeRT July 2000 water sampling event.

Justification and Associated New Task Changes: (1) Agreements reached with regulators (UDEQ and EPA) following the on-site visit April 4, 2000 regarding surface water and ground water sampling locations and subsequent review of the data from the April sampling; (2) Newly installed PeRT and OU III wells; (3) Clarification by the GJO Laboratory on sample volumes and combining NO_3, NO_2, and Anion aliquots; (4) changes to the analyte list at specified PeRT Well and OU III locations; and (5) Correction to container types for Radon samples.

Organization(s) Affected: Field sampling personnel and GJO Analytical Laboratory

Affected Documents: MMTS. *OU III, Interim Remedial Action Surface Water and Ground Water Monitoring Plan*, Rev. 3, December 1999 (MAC-MSGRAP 1.3.5-1)

Directive: This directive (i.e., MSG-00-04) (1) supersedes and cancels Directives MSG-00-02 and MSG-00-03 effective dates April 10, 2000; (2) identifies changes to OU III sample and field measurement locations; (3) provides clarification to PeRT analyte aliquots and water level measurement locations; (4) modifies the analyte list at specified PeRT Well and OU III locations; and (5) makes a correction to the type of sample container for Radon samples.

(1) OU III: Modification to Surface Water Locations. (refer to Attachment 1 for a sketch of the locations and Attachment 2 for a list of OU III ground water and surface water locations to be sampled and measured)

a. Surface water samples and field parameter measurements and stream flow measurements will be obtained at the following locations: SW00-01, SW00-02, SW00-03, Sorenson, and SW00-04. Analytes and sample/measurement methods will be as specified in the plan. Sampling from locations SW95-01, SW92-09, SW92-07, SW92-06, SW99-01, and SW99-04 is discontinued. Sampling and flow measurements at downgradient locations SW94-01 and SW92-08 will remain as scheduled by the plan.
b. Collect a filtered metals sample, and 1-liter unfiltered isotopic "U" (U-234 and U-238) sample at the previously sampled "Deer Draw" seep (GB4307) and pond (GB5215) locations on the southeast Millsite hillsides.

(2) OU III: Modification to Ground Water Locations . (refer to Attachment 1 for a sketch of the locations and Attachment 2 for a list of OU III ground water and surface water locations to be sampled and measured)Add Near South Site wells 31SW93-197-2 through 31SW93-197-5 and AEC-6 to the well list. Collect a full sample set, including isotopic "U" (U-234 and U-238) at each location. Analytical, sampling and field measurement requirements will be as specified by the plan.

a. Add the 7 newly installed well locations (MW00-01 through MW00-04 and MW00-06 through MW00-08) to the list of OU III wells that will be sampled on a quarterly basis. Attachment 1 provides a sketch of the well locations and well identification numbers. The 6 temporary wells (T99-xx) scheduled to be sampled in July will be sampled as scheduled. These wells (T99-01, -02, -03, -11, -12, and –13) will be abandoned following this sampling event. Analytes and sample measurement methods will be as specified in the plan.
b. Water level measurements will be obtained at all well locations as specified in the plan (Table 4.6-1)

(3) PeRT Wall: Modification to sample and measurement requirements at PeRT well and piezometer locations:

a. Wells being sampled for Nitrite may combine Anions and Nitrate (NO_3 as N), and Nitrite (NO_2 as N) in the same 125ml bottle. Sample tickets and labels should identify each of the three analytes as NO_2 as N, NO_3 as N, and Anions.

(3) PeRT Wall: (continued)

b. Sample tickets and labels for samples being collected for Ammonium analysis will be identified as Ammonium (NH_4 as N)

Sample Requirements:

Parameters	Containers	Preservation	Holding Times
Nitrite (NO_2 as N)	125ml HDPE	Filtered by 0.45 µm filter Cool to 4° C	48 hours
Ammonium (NH_4 as N)	125ml HDPE	Filter by 0.45 µm filter Cool 4° C, H_2SO_4 pH < 2	28 days

c. Water level measurements will be obtained at the 61PeRT Wall well locations, the 14 new well locations (TW-01 through TW-14), and the 32 piezometer locations in the vicinity of the PeRT Wall wells. See Attachment 3 (well list) and Attachment 4 (well location map) for the identity and location of the wells and piezometers.

d. Analyte requirements at specified well locations have been revised. Attachment 5 lists the well identifications and analyte requirements at each location. A sample will be collected from each of the new wells (TW-01 through TW-14) for metals analysis.

(4) Container types for Radon (Rn-222) samples:
Per direction from the GJO Laboratory, clear and amber 40-ml glass vials with Teflon septa are both approved for use when collecting samples for Rn-222 analysis (reference Table 5.1-1 pg. 5-1 in the plan).

Review and Concurrence:

Kristen McClellen, OU III Project Manager

Task Order Manager Approval to Issue:

Mike Butherus, Manager, Major Projects 7/11/00

Clay Carpenter, PeRT Project Manager 7/10/2000

Effective Date: July 17, 2000 ~~July 5, 2000~~ 7/10/00

Expiration Date: September 30, 2000

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MMTS Task Order Managers Directive Log
Jalane Glasgow - Record File MRAP 1.3.5
Dennis DuPont – Record File PTW 2.4.1
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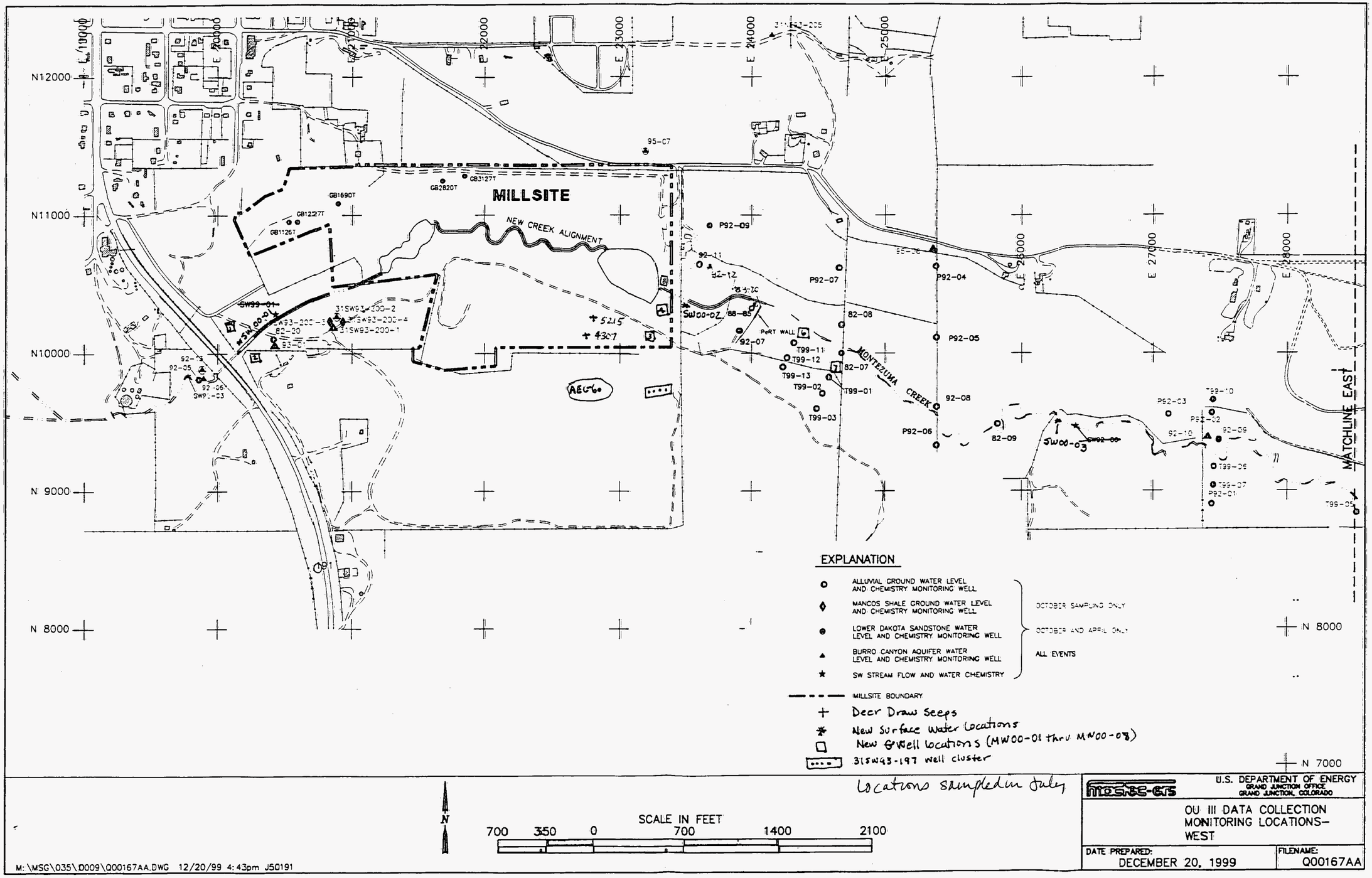
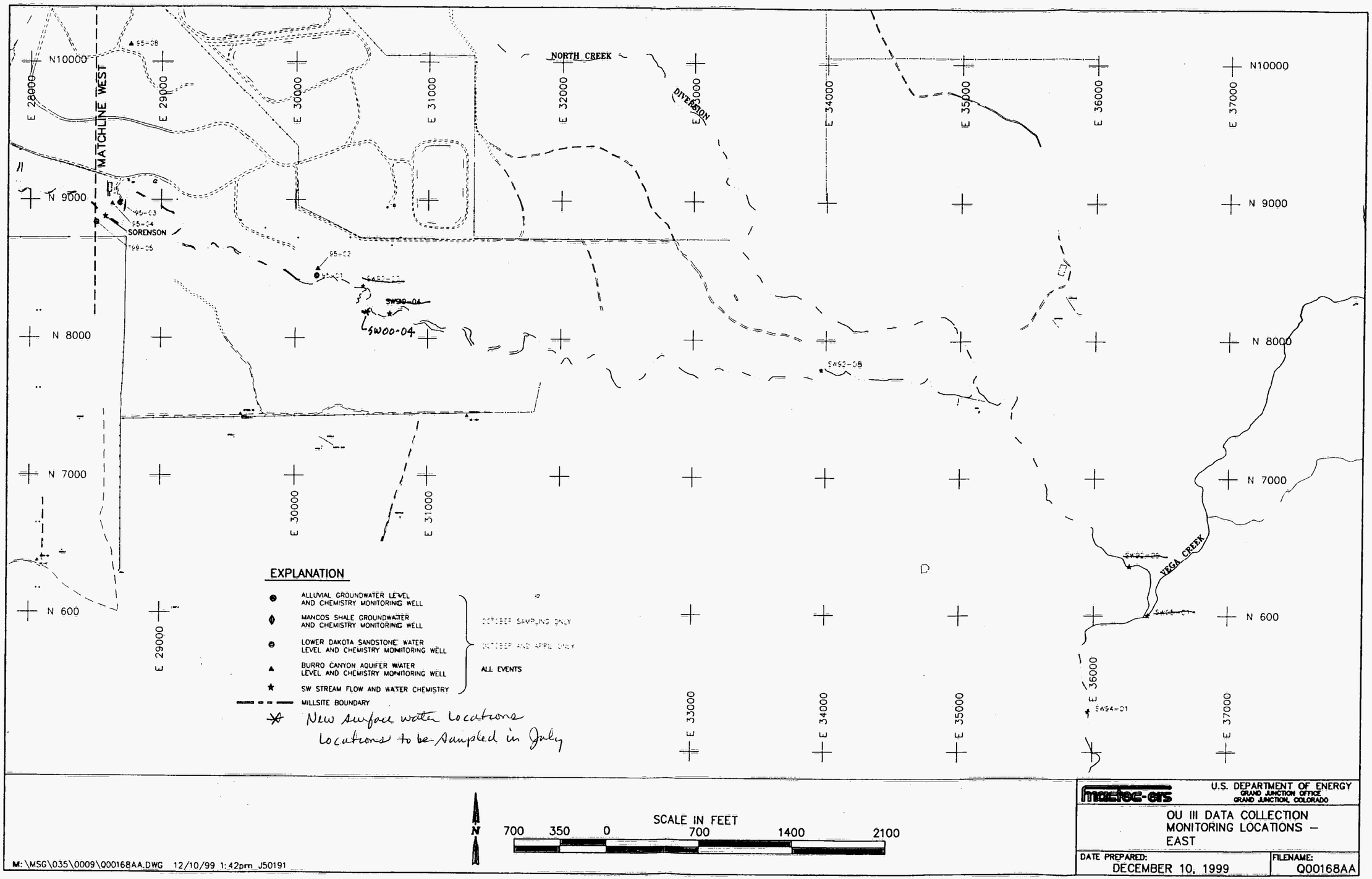
Cathy Kelleher (2 copies) - Project Administrative Record



Monticello Program Directive MSG-00-04 Attachment 1. OU III SW/GW Locations and ID Nos.

(Pg 1 of 2)



Monticello Program Directive MSG-00-04 Attachment 1. OU III SW/GW Locations and ID Nos.

(pg 2 of 2)

Attachment 2. Monticello Program Directive MSG-00-04
OU III Ground Water and Surface Water Sampling, Water Level, and Flow Measurement Locations

SAMPLING LOCATION			IRA ANNUAL MONITORING (fy 2000)		
General Location	Description	Location ID	July	WL/Insp/Flow	Notes
Upgradient	Alluvial	92-05		X	
	Burro Canyon	92-06		X	
	Dakota Sandstone	92-13		X	
	Montezuma Creek	SW92-03			
Millsite	Alluvial	82-20		X	
		MW00-01	X	X	
		MW00-02	X	X	
		MW00-03	X	X	
		MW00-04	X	X	
		MW00-08	X	X	
		GB1126T	X	X	
		GB1227T	X	X	
		GB1690T	X	X	
		GB2820T	X	X	
		GB3127T	X	X	
	Burro Canyon	93-01		X	
		31SW93-200-1		X	
	Dakota Sandstone	31SW93-200-2		X	
	Mancos Shale	31SW93-200-3		X	
		31SW93-200-4		X	
	"Deer Draw Seeps"	Seep 4307	X	X	
		Seep 5215	X	X	
	Montezuma Creek	SW00-01	X	X	
		~~SW99-01~~			Discontinue sampling and flow measurements 4/00
		SW00-02	X	X	
Downgradient	Alluvial	MW00-06	X	X	
		MW00-07	X	X	
		82-07	X	X	
		82-08	X	X	
		~~82-09~~	~~X~~		Well has not been located
		88-85	X	X	
		92-07	X	X	
		92-08	X	X	

Attachment 2. Monticello Program Directive MSG-00-04 (continued)
OU III Ground Water and Surface Water Sampling, Water Level, and Flow Measurement Locations

SAMPLING LOCATION			IRA ANNUAL MONITORING (FY 2000)		
General Location	Description	Location ID	July	WL/Insp/Flow	Notes
Downgradient	Alluvial	92-09		X	
		92-11	X	X	
		95-01		X	
		95-03		X	
		T99-01	X	X	
		T99-02	X	X	
		T99-03	X	X	
		T99-05		X	
		T99-06		X	
		T99-07		X	
		T99-10		X	
		T99-11	X	X	
		T99-12	X	X	
		T99-13	X	X	
		P92-01		X	
		P92-02		X	
		P92-03		X	
		P92-04	X	X	
		P92-05	X	X	
		P92-06	X	X	
		P92-07	X	X	
		P92-09	X	X	
	Burro Canyon	95-02		X	
		95-04		X	
		95-06		X	
		95-08		X	
		31NE93-205		X	
		92-10		X	
	Burro Canyon/Dakota	83-70		X	
	Dakota Sandstone	92-12		X	
		95-07		X	

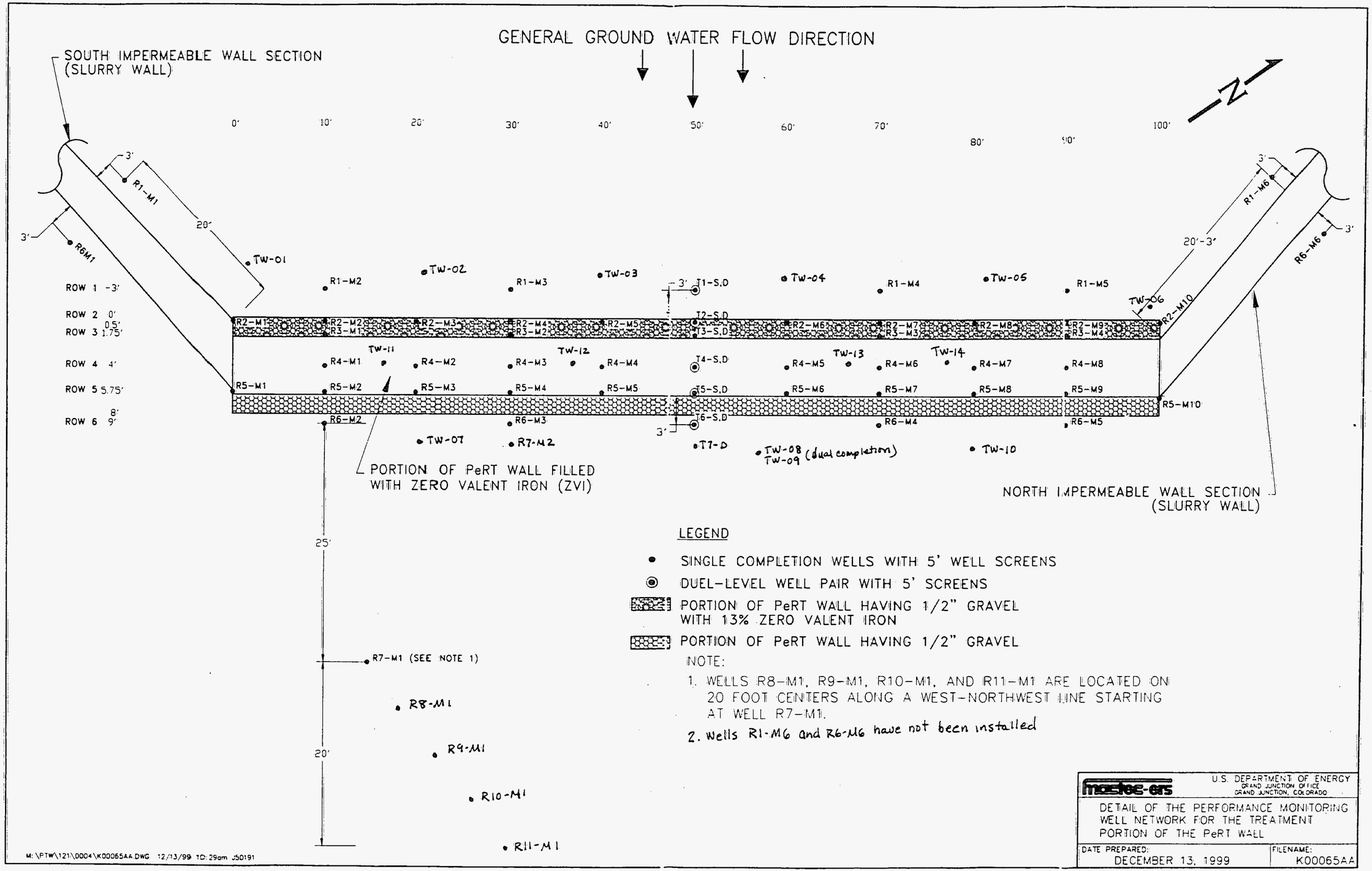
Attachment 2. Monticello Program Directive MSG-00-04 (continued)
OU III Ground Water and Surface Water Sampling, Water Level, and Flow Measurement Locations

SAMPLING LOCATION			IRA ANNUAL MONITORING (fy 2000)		
General Location	Description	Location ID	July	WL/Insp/Flow	Notes
Downgradient	Montezuma Creek	SW00-03	X	X	
		~~SW92-06~~			Discontinue sampling and flow measurements 4/00
		Sorenson Site	X	X	
		SW00-04	X	X	
		~~SW99-04~~			Discontinue sampling and flow measurements 4/00
		~~SW92-07~~			Discontinue sampling and flow measurements 4/00
		SW92-08			
		~~SW92-09~~			Discontinue sampling and flow measurements 4/00
		~~SW95-01~~			Discontinue sampling and flow measurements 4/00
		SW94-01			
Near South Site	Mancos	31SW93-197-5	X	X	
		31SW93-197-4	X	X	
	Dakota Sandstone	31SW93-197-3	X	X	
	Burro Canyon	31SW93-197-2	X	X	
		AEC-6	X	X	

Attachment 3. Monticello Program Directive MSG-00-04
List of PeRT Well and Piezometer Identification Numbers

PeRT Well List			
R1–M1	R4–M1	R6–M1	**New Wells**
R1–M2	R4–M2	R6–M2	TW-01
R1–M3	R4–M3	R6–M3	TW-02
T1–S	R4–M4	T6–S	TW-03
T1–D	T4–S	T6–D	TW-04
R1–M4	T4–D	R6–M4	TW-05
R1–M5	R4–M5	R6–M5	TW-06
R2–M1	R4–M6	R7–M1	TW-07
R2–M2	R4–M7	R7-M2	TW-08
R2–M3	R4–M8	T7-D	TW-09
R2–M4	R5–M1	R8–M1	TW-10
R2–M5	R5–M2	R9–M1	TW-11
T2–S	R5–M3	R10–M1	TW-12
T2–D	R5–M4	R11–M1	TW-13
R2–M6	R5–M5		TW-14
R2–M7	T5–S		
R2–M8	T5–D		
R2–M9	R5–M6		
R2–M10	R5–M7		
R3–M1	R5–M8		
R3–M2	R5–M9		
T3–S	R5–M10		
T3–D			
R3–M3			
R3–M4			

PeRT Piezometer List	
PW-01	PW-16
PW-02	PW-16A
PW-03	PW99-16
PW-04	PW-17
PW-05	PW-18
PW-06	PW-19
PW-07	PW-20
PW-08	PW-22
PW-09	PW-23
PW-10	PW-24
PW-11	PW-25
PW-12	PW-26
PW-13	PW-27
PW-14	PW-28
PW-14A	PW-29
PW-15	PW-30
PW-15A	



U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE GRAND JUNCTION, COLORADO	
DETAIL OF THE PERFORMANCE MONITORING WELL NETWORK FOR THE TREATMENT PORTION OF THE PeRT WALL	
DATE PREPARED: DECEMBER 13, 1999	FILENAME: K00065AA

Monticello Program Directive MSG-00-04 Attachment 4. PeRT Well Location/ID Map

(pg 1 of 2)

PW-30

PW-28

PW99-16

PW-18

PW-20

PW-29

NEW MONTEZUMA CREEK

83-70

PW-22

CULVERT

PW-27

PW-19

88-85

TW-06

TW-05

TW-14

TW-10

PW-26

TW-13

TW-04

TW-09

TW-08

TW-03

TW-12

TW-02

TW-11

TW-07

PW-25

TW-01

R11-M1

R10-M1

R9-M1

R8-M1

R7-M1

PW-16A

R6-M1

PW-16

PW-15A

PW-15

PW-09

PW-14A

PW-03

PW-24

PW-14

PW-08

92-07

PW-13

PW-07

PW-02

PW-23

PW-12

PW-06

N

SCALE IN FEET

15 7.5 0 15 30 45

PW-01

PW-05

PW-11

PW-04

PW-10

PW-17

OU III Monitor well

PeRT well / Piezometer Locations sampled in July

Monticello Program Directive MSG-00-04
Attachment 4
PeRT Well / Piezometer Locations
(pg 2 of 2)

PRELIMINARY DESIGN

macTec-ers

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION OFFICE, COLORADO

MONTICELLO, UTAH

APPROVALS

TITLE1
TITLE2
TITLE3

ENG-000-0000-00-000

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Attachment 5. Monticello Program Directive MSG-00-04
PeRT Wall Wells and Analyte Requirements

PeRT Well No.	IRA Annual Monitoring – July 2000 (revised 7/5/00)					
	Metals (As, Mo, Se, U, V)	Anions / Cations[1] (Cl, SO_4, NO_3 as N, Ca, K, Mg, and Na)	Iron & Manganese[2]	Nitrite (NO_2 as N)	Ammonium (NH_4 as N)[3]	Ra-226
R1–M1	X					7/00, 7/01
R1–M2	X	X	X	X	X	
R1–M3	X	X	X	X	X	
T1–S	X	X	X	X	X	
T1–D	X	X	X	X	X	
R1–M4	X	X	X	X	X	
R1–M5	X	X	X	X	X	7/00, 7/01
R2–M1	X					
R2–M2	X	X	X	X	X	
R2–M3	X					
R2–M4	X	X	X	X	X	
R2–M5	X					
T2–S	X	X	X	X	X	
T2–D	X	X	X	X	X	
R2–M6	X					
R2–M7	X	X	X	X	X	
R2–M8	X					
R2–M9	X	X	X	X	X	
R2–M10	X					
R3–M1	X	X	X	X	X	
R3–M2	X	X	X	X	X	
T3–S	X	X	X	X	X	
T3–D	X	X	X	X	X	
R3–M3	X	X	X	X	X	
R3–M4	X					
R4–M1	X	X	X	X	X	
R4–M2	X					
R4–M3	X	X	X	X	X	
R4–M4	X					
T4–S	X	X	X	X	X	
T4–D	X	X	X	X	X	
R4–M5	X					
R4–M6	X	X	X	X	X	
R4–M7	X					
R4–M8	X	X	X	X	X	
R5–M1	X					
R5–M2	X	X	X	X	X	7/00, 7/01
R5–M3	X					
R5–M4	X	X	X	X	X	
R5–M5	X					
T5–S	X	X	X	X	X	
T5–D	X	X	X	X	X	
R5–M6	X					
R5–M7	X	X	X	X	X	
R5–M8	X					

Attachment 5. Monticello Program Directive MSG-00-04
PeRT Wall Wells and Analyte Requirements (continued)

PeRT Well No.	IRA Annual Monitoring – July 2000 (revised 7/5/00)					
	Metals (As, Mo, Se, U, V)	Anions / Cations[1] (Cl, SO_4, NO_3 as N, Ca, K, Mg, and Na)	Iron & Manganese[2]	Nitrite (NO_2 as N)	Ammonium (NH_4 as N)[3]	Ra-226
R5–M9	X	X	X	X	X	7/00, 7/01
R5–M10	X					
R6–M1	X					
R6–M2	X	X	X	X	X	
R6–M3	X	X	X	X	X	
T6–S	X	X	X	X	X	
T6–D	X	X	X	X	X	7/00, 7/01
R6–M4	X	X	X	X	X	
R6–M5	X	X	X	X	X	
R7-M2	X	X	X	X	X	
T7-D	X	X	X	X	X	7/00, 7/01
R7–M1	X	X	X	X	X	
R8–M1	X	X	X	X	X	
R9–M1	X	X	X	X	X	
R10–M1	X	X	X	X	X	
R11-M1	X	X	X	X	X	
PW-11	X					
PW-17	X					
TW-01	X					
TW-02	X					
TW-03	X					
TW-04	X					
TW-05	X					
TW-06	X					
TW-07	X					
TW-08	X					
TW-09	X					
TW-10	X					
TW-11	X					
TW-12	X					
TW-13	X					
TW-14	X					

[1] When applicable, Anions and NO_3 will be collected as a separate sample fractions. Cations will be identified with the metals sample. Anions, NO_3 as N, and NO_2 as N may be combined in the same sample container (125ml, filtered and cooled) and will be individually identified on the sample ticket and label.

[2] Iron and Manganese will be identified with the metals sample when applicable and listed as such on the sample ticket and label.

[3] The samples submitted for ammonium analysis will be identified on the sample ticket and label as NH_4 as N

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Program Directive

MMTS - OU III / PeRT **Program/Project** **Directive No.** MSG-00-05

Task Order No. MAC01-00 (Task No. 350705008) / MAC01-12 (Task No. 352002006)

Initiated By: Tim Bartlett, Field Supervisor, MACTEC-ERS

Directive Subject: Modifications to the OU III / PeRT October 2000 water sampling event.

Justification and Associated New Task Changes: In general, this Program Directive is an extension of Directive MSG-00-04 with modifications to OU III and PeRT Wall sample locations and the addition of isotopic uranium analysis at all surface water locations.

(1) Agreements reached with regulators (UDEQ and EPA) following the on-site visit April 4, 2000 regarding surface water and ground water sampling locations and subsequent review of the data from the April sampling;
(2) Newly installed PeRT and OU III wells;
(3) Clarification by the GJO Laboratory on sample volumes and combining NO_3, NO_2, and anion aliquots;
(4) Changes to the analyte list at specified PeRT Well and OU III locations; and
(5) Correction to container types for radon samples.

Organization(s) Affected: Field sampling personnel and GJO Analytical Laboratory

Affected Documents: MMTS, *OU III, Interim Remedial Action Surface Water and Ground Water Monitoring Plan*, Rev. 3, December 1999 (MAC-MSGRAP 1.3.5-1)

Directive: This directive (i.e., MSG-00-05) and the listed attachments

(1) supersedes and cancels Directive MSG-00-04
(2) identifies changes to OU III sample and field measurement locations;
(3) provides clarification to PeRT analyte aliquots and water level measurement locations;
(4) clarifies instrument calibration requirements during sampling of PeRT wells
(5) modifies the analyte list at specified PeRT Well and OU III locations; and
(6) corrects the type of sample container for radon samples.

List of attachments:
Attachment 1: List of OU III sample/water level locations and analytical parameters and preservation requirements
Attachment 2: Surface water sample and stream flow measurement locations
Attachment 3: Ground water sample and water level measurement locations
Attachment 4: List of PeRT well sample locations, analytical parameters and preservation requirements
Attachment 5: PeRT well locations
Attachment 6: PeRT wall piezometer locations

(1) General requirements for instrument calibration/operational checks (OU III and PeRT wells)
Instruments used in obtaining field parameter measurements will be perfromed in accordance with the established procedures. A 3-point operational check of the conductivity probe will be performed and documented at the start, middle and end of each sampling day. Instrument checks and calibrations during PeRT wall sampling will be performed and documented at the start, and middle of each day. pH probes will be recalibrated as necessary to bracket the source water pH, in accordance with established procedures.

(2) OU III: Modification to Surface Water Locations. (refer to Attachments 1 and 2)
Surface water samples and field parameter measurements and stream flow measurements will be obtained at the following locations: SW92-03, SW00-01, SW00-02, SW00-03, Sorenson, SW00-04, SW92-08 and SW94-01. Surface water samples only will be collected from "Deer Draw Seeps" (4307 and 5215). Analytes and sample/measurement methods will be as specified in the attachment in conjunction with the plan. Sampling from locations SW95-01, SW92-09, SW92-07, SW92-06, SW99-01, and SW99-04 is discontinued.

a. Sample and analytical requirements for the Deer Draw Seep locations (Seep 4307 and Seep 5215) are as specified in the attachment.

b. Collect a 1-liter unfiltered sample at all surface water locations (including the seeps) for isotopic uranium (U-234 and U-238) analysis.

(3) OU III: Modification to Ground Water Locations (Refer to attachments 1 and 3).

a. Include Near South Site wells 31SW93-197-2 through 31SW93-197-5 to the well list. Collect a full sample set, including isotopic "U" (U-234 and U-238) at each location. Analytical, sampling and field measurement requirements will be as specified by the plan.

b. Add the 7 newly installed well locations (MW00-01 through MW00-04 and MW00-06 through MW00-08) to the list of OU III wells that will be sampled on a quarterly basis. Well T00-01 will be sampled if MW00-08 has insufficient water.

c. The following 8 temporary wells (Txx-xx) will be sampled T99-03, -05, -06, -07, -10, -13, T00-18, and T00-26.

d. Water level measurements will be obtained at all temporary wells not scheduled for sampling (T00-01 through T00-25, excluding T00-16 that has not been installed and T00-18 that will be sampled).

(4) PeRT Wall: Modification to sample and measurement requirements at PeRT well and piezometer locations: (Refer to attachments 4 – 6)

a. Wells being sampled for nitrite may combine anions and nitrate (NO_3 as N), and nitrite (NO_2 as N) in the same 125ml bottle. Sample tickets and labels should identify each of the three analytes as NO_2 as N, NO_3 as N, and anions.

b. Sample tickets and labels for samples collected for ammonium analysis will be identified as ammonium (NH_4 as N)

c. Analyte requirements at specified well locations have been revised. Attachment 4 lists the well identifications and analyte requirements at each location.
- A sample will be collected from each of the new wells TW-01 through TW-14 for metals, including Fe and Mn.
- Piezometers PW-11, PW15, PW99-16, PW 17, and PW-28 will be sampled for metals (including Fe and Mn), cations, anions, and nitrate (NO_3 as N) analysis.

d. Water level measurements will be obtained at the 63 PeRT Wall well locations, the 14 new well locations (TW-01 through TW-14), and the 32 piezometer locations in the vicinity of the PeRT Wall wells. See Attachments 5and 6 for the identity and location of the wells and piezometers.

(5) Container types for radon (Rn-222) samples:
Per direction from the GJO Laboratory, clear and amber 40-ml glass vials with Teflon septa are both approved for use when collecting samples for Rn-222 analysis (reference Table 5.1-1 pg. 5-1 in the plan).

Review and Concurrence:

Kristen McClellen, OU III Project Manager

Task Order Manager Approval to Issue:

10/12/00
Mike Butherus, Manager, Major Projects

Clay Carpenter, PeRT Project Manager

Effective Date: October 16, 2000

Expiration Date: January 8, 2001

Distribution: w/ Attachments (6)
MMTS Task Order Managers Directive Log
Jalane Glasgow - Record File MRAP 1.3.5
Dennis DuPont – Record File PTW 2.4.1
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Cathy Kelleher (2 copies) - Project Administrative Record

Monticello Program Directive MSG-00-05

Attachment 1. List of OU III Sample/Water Level Locations and Analytical Parameters and Preservation Requirements

Analytical Parameter	Container Type / Size	Preservation	Holding Time
Metals (As, Fe, Mn, Mo, Se, Th-230, U, V)	HDPE 500mL	Filter by 0.45- m filter; HNO_3 to pH<2	6 Months
Major Cations (Ca, Mg, K, and Na) (from same bottles as metals)	HDPE		
Major Anions (Cl, F, and SO_4)	HDPE 125 mL	Filter by 0.45- m filter; Cool to 4° C	28 Days
Bromide	HDPE 125 mL	Cool to 4° C	28 Days
Nitrate (NO_3 + NO_2 as N)	HDPE 125 mL	Filter by 0.45- m filter; Cool to 4° C; H_2SO_4 to pH<2	28 Days
Total Dissolved Solids (filterable residue)	HDPE 125 mL	Cool to 4° C	7 Days
Gross Alpha/Gross Beta	HDPE 1 L	*Ground Water*: filter by 0.45- m filter; *Surface Water*: unfiltered; HNO_3 to pH<2 (both GW and SW)	6 Months
Lead-210	HDPE 1 L x 3 each	*Ground Water*: filter by 0.45- m filter; *Surface Water*: unfiltered HNO_3 to pH<2 (both GW and SW)	6 Months
Radium-226	HDPE 1 L	*Ground Water*: filter by 0.45- m filter; *Surface Water*: unfiltered; HNO_3 to pH<2 (both GW and SW)	6 Months
Radon-222	Glass w/TeflonSepta 40 mL x 3 each	Cool to 4° C	Not Established
Isotopic Uranium (U-234, and U-238)[1] ~~(*Ground Water*: from same bottle as metals)~~	HDPE 1 L	*Ground Water*: filter by 0.45-µm filter; HNO_3 to pH<2	6 Months
Isotopic Uranium (U-234, and U-238)[2] (*Surface Water* sample)	HDPE 1 L	*Surface Water*: unfiltered HNO_3 to pH<2	6 Months

[1] Isotopic uranium analysis will be conducted on samples from bedrock wells, 95-series alluvial wells, and from the 31SW93-197-x well cluster.

[2] Collect a 1 Liter sample unfiltered for isotopic uranium (U-234 and U-238) analyses at all surface water sites. Measure stream flow at all surface water locations.

[3] Record water level measurements of all newly installed Millsite temporary wells i.e., T00-01 through T00-26. [East wells T00-01 through T00-07 (north to south), West wells T00-08 through T00-15 (north to south), and South wells T00-17 through T00-26 (west to east)]

[4] Collect samples from T00-01 only if MW00-08 is dry.

[5] Collect Metals and Nitrate (NO_3 + NO_2 as N) sample aliquots at T00-18 and T00-26

[6] Collect the following samples at the seep locations: metals, cations, anions, nitrate (NO_3 + NO_2 as N), gross alpha/gross beta, isotopic uranium (U-234 and U-238).

List of Surface Water and Ground Water Sampling and Measurement locations for October 2000

Surface Water [2]	Ground Water	Ground Water	Ground Water	Ground Water	Water Levels [3]	Water Levels [3]
SW92-03	82-07	P92-01	31NE93-205 [1]	T99-03	T00-02	T00-14
SW00-01	82-08	P92-02	31SW93-197-2 [1]	T99-05	T00-03	T00-15
Seep 4307 [6]	82-20	P92-03	31SW93-197-3 [1]	T99-06	T00-04	T00-16
Seep 5215 [6]	83-70 [1]	P92-04	31SW93-197-4 [1]	T99-07	T00-05	T00-17
SW00-02	88-85	P92-05	31SW93-197-5 [1]	T99-10	T00-06	T00-19
SW00-03	92-05	P92-06	31SW93-200-1 [1]	T99-13	T00-07	T00-20
Sorenson	92-06 [1]	P92-07	31SW93-200-2 [1]	T00-01 [4]	T00-08	T00-21
SW00-04	92-07	P92-09	31SW93-200-3	T00-18 [5]	T00-09	T00-22
SW92-08	92-08	93-01 [1]	31SW93-200-4	T00-26 [5]	T00-10	T00-23
SW94-01	92-09	95-01 [1]	MW00-01		T00-11	T00-24
	92-10 [1]	95-02 [1]	MW00-02		T00-12	T00-25
	92-11	95-03 [1]	MW00-03		T00-13	
	92-12 [1]	95-04 [1]	MW00-04			
	92-13 [1]	95-06 [1]	MW00-06			
		95-07 [1]	MW00-07			
		95-08 [1]	MW00-08			

Monticello Program Directive MSG-00-05,
Attachment 4. PeRT Well Sample Locations, Analytical Parameters, and Preservation Requirements

PeRT Well No.	IRA Annual Monitoring – October 2000						Comments
	Metals[1] (As, Mo, Se, U, V)	Anions / Cations[1] (Cl, SO_4, NO_3 as N Ca, K, Mg, and Na,)	Iron & Manganese[1]	Nitrite NO_2 as N^1	Ammonium NH_4 as N^2	Ra-226	pH and recovery comments based on previous sampling
R1-M1	X					7/00, 7/01	pH < 7
R1-M2	X	X	X	X	X		pH < 7
R1-M3	X	X	X	X	X		pH < 7
T1-S	X	X	X	X	X		pH < 7
T1-D	X	X	X	X	X		pH < 7
R1-M4	X	X	X	X	X		pH < 7
R1-M5	X	X	X	X	X	7/00, 7/01	pH < 7
R1-M6	X						
R2-M1	X						
R2-M2	X	X	X	X	X		
R2-M3	X						
R2-M4	X	X	X	X	X		
R2-M5	X						pH < 7
T2-S	X	X	X	X	X		
T2-D	X	X	X	X	X		
R2-M6	X						
R2-M7	X	X	X	X	X		pH < 7
R2-M8	X						pH < 7
R2-M9	X	X	X	X	X		
R2-M10	X						
R3-M1	X	X	X	X	X		
R3-M2	X	X	X	X	X		
T3-S	X	X	X	X	X		
T3-D	X	X	X	X	X		
R3-M3	X	X	X	X	X		
R3-M4	X	X	X	X	X		
R4-M1	X	X	X	X	X		pH > 9
R4-M2	X						
R4-M3	X	X	X	X	X		
R4-M4	X						
T4-S	X	X	X	X	X		pH > 9
T4-D	X	X	X	X	X		
R4-M5	X						pH > 9
R4-M6	X	X	X	X	X		pH > 9
R4-M7	X						pH > 9
R4-M8	X	X	X	X	X		pH > 9
R5-M1	X						pH > 9
R5-M2	X	X	X	X	X	7/00, 7/01	pH > 9
R5-M3	X						pH > 9
R5-M4	X	X	X	X	X		pH > 9
R5-M5	X						pH > 9
T5-S	X	X	X	X	X		pH > 9
T5-D	X	X	X	X	X		
R5-M6	X						
R5-M7	X	X	X	X	X		
R5-M8	X						pH > 9
R5-M9	X	X	X	X	X	7/00, 7/01	pH > 9
R5-M10	X						
R6-M1	X						pH < 7
R6-M2	X	X	X	X	X		
R6-M3	X	X	X	X	X		pH < 7 (Slow recovery)

PeRT Well No.	IRA Annual Monitoring – October 2000						Comments
	Metals[1] (As, Mo, Se, U, V)	Anions / Cations[1] (Cl, SO_4, NO_3 as N Ca, K, Mg, and Na,)	Iron & Manganese[1]	Nitrite NO_2 as N[1]	Ammonium NH_4 as N[2]	Ra-226	pH and recovery comments based on previous sampling
T6–S	X	X	X	X	X		Slow recovery
T6–D	X	X	X	X	X	7/00, 7/01	pH < 7 (Slow recovery)
R6–M4	X	X	X	X	X		(Slow recovery)
R6–M5	X	X	X	X	X		
R6–M6	X						
R7-M2	X	X	X	X	X		pH < 7 (Slow recovery)
T7-D	X	X	X	X	X	7/00, 7/01	pH < 7 (Slow recovery)
R7–M1	X	X	X	X	X		pH < 7
R8–M1	X	X	X	X	X		pH < 7
R9–M1	X	X	X	X	X		pH < 7
R10–M1	X	X	X	X	X		pH < 7
R11-M1	X	X	X	X	X		pH < 7
TW-01	X						pH < 7
TW-02	X						pH < 7
TW-03	X						pH < 7
TW-04	X						pH < 7
TW-05	X						pH < 7
TW-06	X						pH < 7
TW-07	X						
TW-08	X						
TW-09	X						
TW-10	X						
TW-11	X						pH > 9
TW-12	X						
TW-13	X						pH > 9
TW-14	X						pH > 9
PW-11[3]	X	X	X				
PW-15[3]	X	X	X				
PW99-16[3]	X	X	X				
PW-17[3]	X	X	X				pH < 7
PW-28[3]	X	X	X				

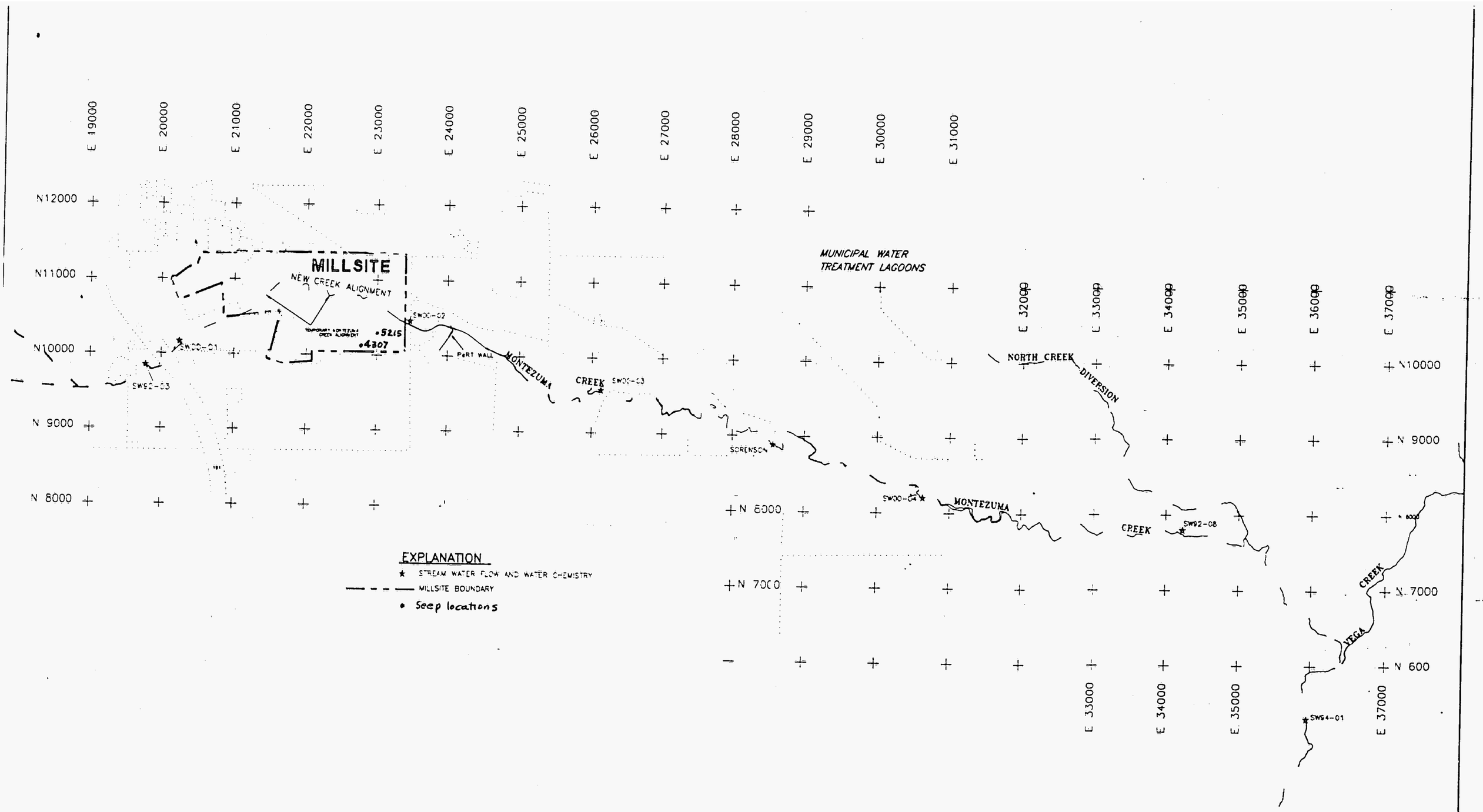
[1] Cations, Iron (Fe) and Manganese (Mn) may be combined in the same sample container with the metals sample and will be individually identified on the sample ticket and label (i.e., Metals + Fe and Mn and Cations). Anions, nitrate (NO_3 as N), and nitrite (NO_2 as N) may be combined in the same sample container and will be individually identified as such on the sample ticket and label.

[2] The samples submitted for ammonium analysis will be identified on the sample ticket and label as ammonium (NH_4 as N)

[3] Piezometers PW-11, PW-15, PW99-16, PW 17 and PW-28 will be sampled as scheduled above. Refer to the table below for container, preservation and holding times. Metals (including Fe and Mn) and cations will be from the same container. Anions and nitrate (NO_3 as N) will be separate sample aliquots.

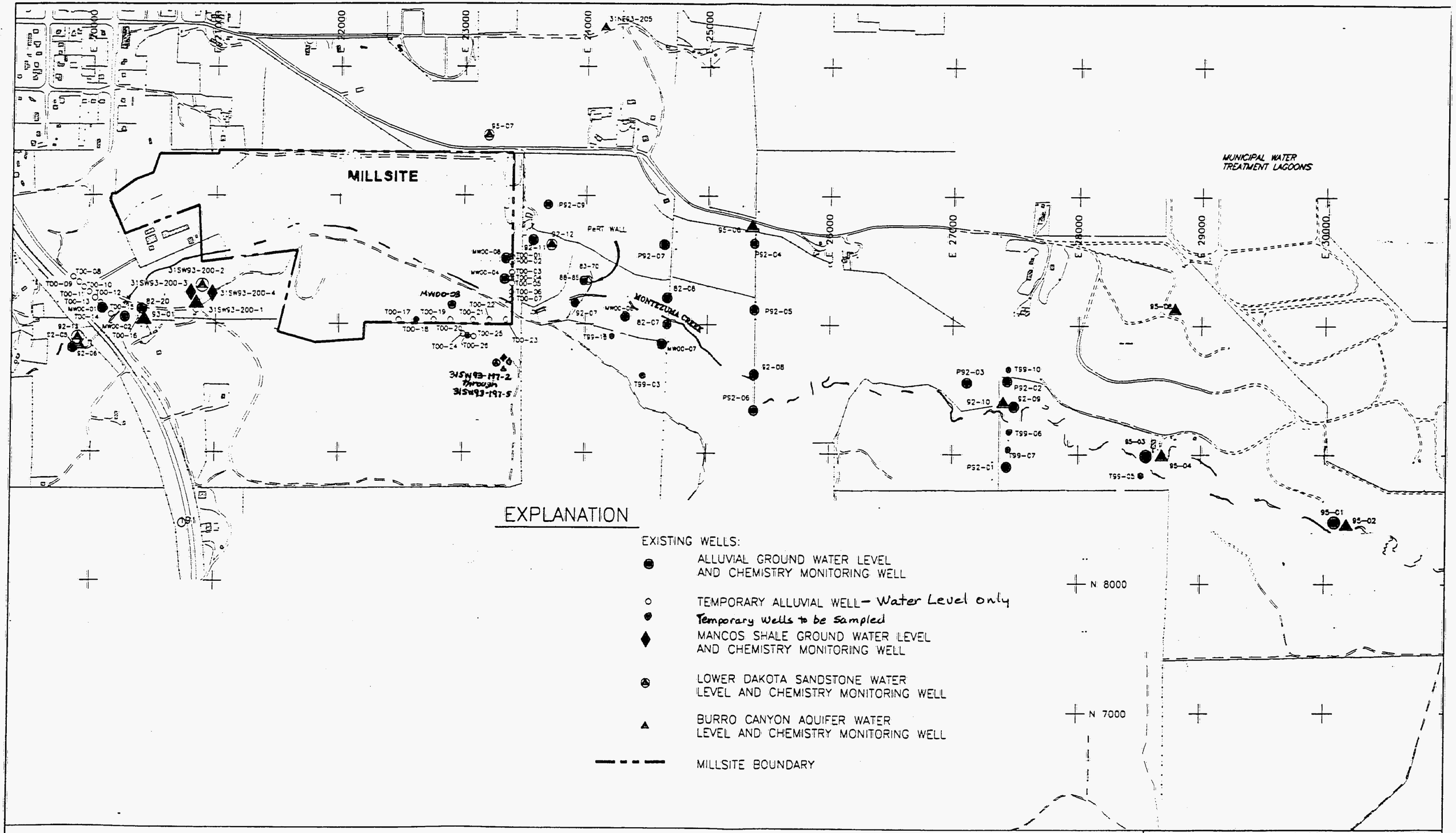
Analytical Parameters, Containers, Preservation and Holding Times

Analyte	Container (Type / Size)		Preservation	Holding time
Metals (As, Mo, Se, U, V) Iron (Fe) & Manganese (Mn)[2, 3] Cations[1] (Ca, K, Mg, and Na)	HDPE	500ml	HNO_3 to pH < 2	6 months
Anions (Cl, SO_4)[3] Nitrate (NO_3 as N) Nitrite (NO_2 as N)	HDPE	125ml	Filtered by 0.45 µm filter Cool to 4° C	48 hours
Nitrate (NO_3 as N)[3]	HDPE	125ml	Filtered by 0.45 µm filter Cool to 4° C H_2SO_4 to pH < 2	28 days
Ammonium (NH_4 as N)	HDPE	125ml	Filtered by 0.45 µm filter Cool to 4° C H_2SO_4 to pH < 2	28 days
Ra-226	HDPE	1 L	HNO_3	6 months



Monticello Program Directive MSG-00-05
Attachment 2. Surface Water Sample and Stream Flow Locations

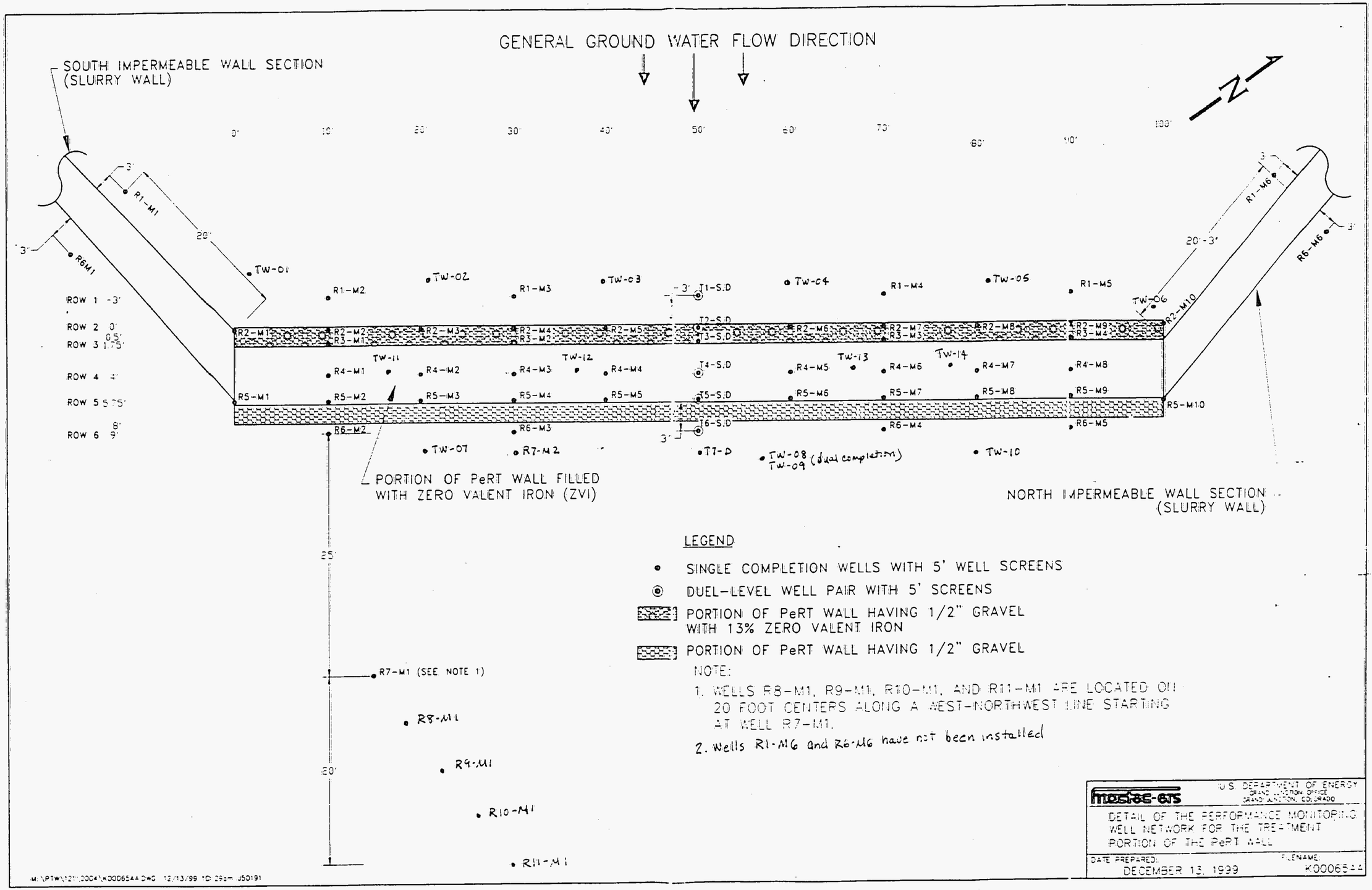
	U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE GRAND JUNCTION, COLORADO
SURFACE WATER MONITORING LOCATIONS	
DATE PREPARED: OCTOBER 3, 2000	FILENAME: Q00174AA



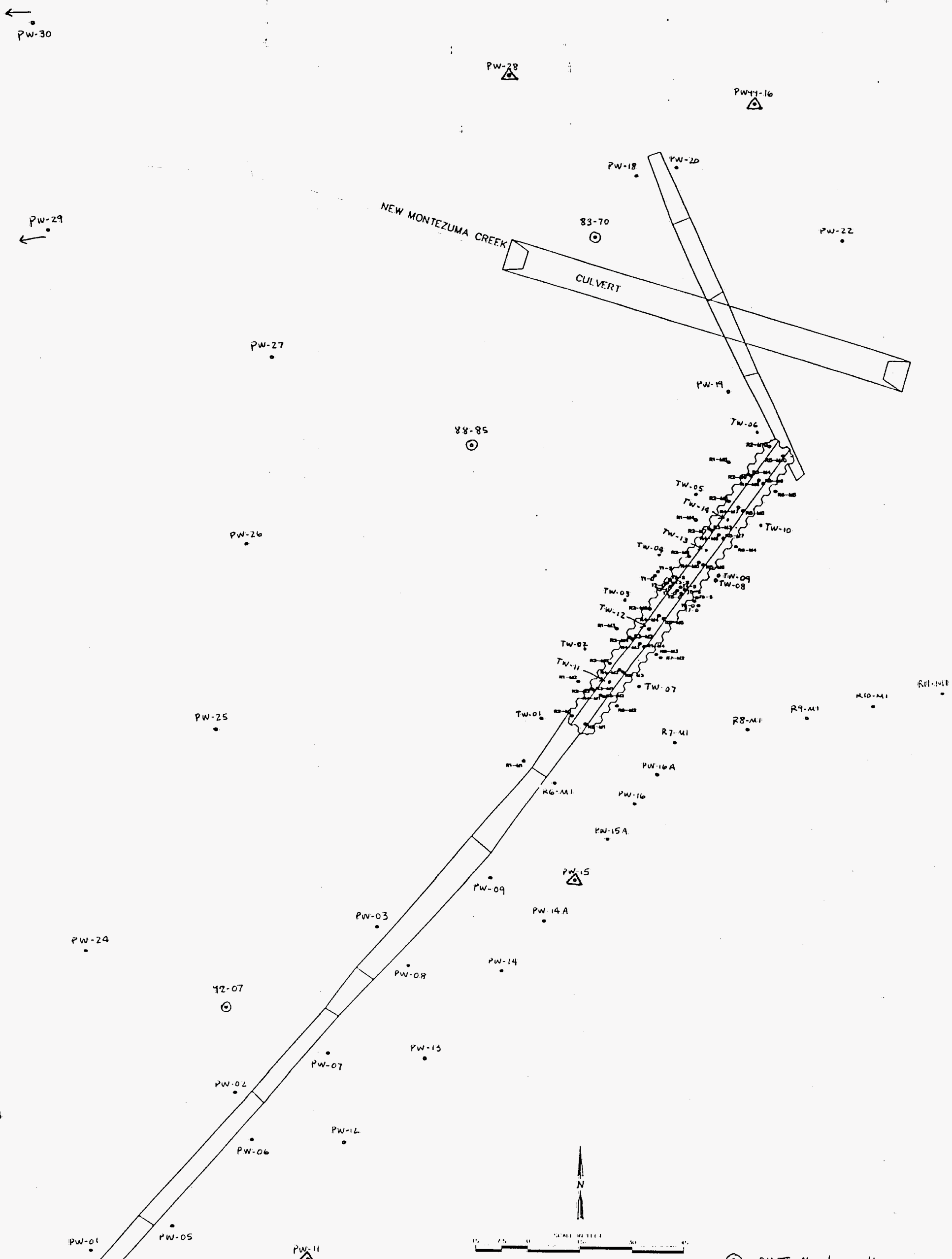
Monticello Program Directive MSG-00-05
Attachment 3. Ground Water Sample and Water Level Measurement Locations

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION OFFICE
GRAND JUNCTION, COLORADO

OU III INTERIM REMEDIAL ACTION
MONITORING WELLS



Monticello Program Directive MSG-00-05 Attachment 5. PeRT Well Locations



Monticello Program Directive MSG-00-05
Attachment 6. PeRT Wall Piezometer Locations

- OU III Monitor well
- PeRT Well / Piezometer Locations
- PeRT piezometer locations to be sampled

mactec-ers

U.S. DEPARTMENT OF ENERGY

MONTICELLO, UTAH

APPROVALS

TITLE1
TITLE2
TITLE3

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Program Directive

MMTS - OU III **Program/Project** **Directive No.** MSG-01-01

Task Order No. MAC01-01 (Task No. 350705012)

Initiated By: Tim Bartlett, Field Supervisor, MACTEC-ERS

Directive Subject: Collection of soil samples from Wetland #1, #2, and #3 at the former millsite.

Justification and Associated New Task Changes: Millsite restoration activities have resulted in soils, some of which have residual contamination, being redistributed at the site. Some of the areas that have received soils will become flooded and will exist as wetlands once ground water and surface water reach their new equilibrium levels. Sampling of soil within the delineated boundaries of the wetlands is easier to accomplish prior to these areas becoming saturated or further disturbed as part of restoration activities. Soil sample results will be used in conjunction with surface water results when they are available to evaluate the potential for these soils to be continuing sources of contamination.

Organization(s) Affected: Field sampling personnel and GJO Analytical Laboratory

Affected Documents:

MMTS, OU III, Interim Remedial Action Work Plan for Operable Unit III-Surface Water and Ground Water, October 2000 (MAC-MSG 2.2.1)

Directive: (1) Collect soil samples from three locations at Wetland 1, 4 locations at Wetland 2, and 4 locations at Wetland 3 (wetlands shown in restoration design drawings). At each location soil will be collected from the 0-6 inch and 24-30 inch depth interval. (2) Submit samples from each depth interval and at each location to the GJO Analytical Laboratory for analysis of contaminant of concern metals (As, Mn, Mo, Se, U, V) and common ions nitrogen, and phosphate. As and Se analysis will be performed by axial ICP; V and Mn analysis by radial ICP; Mo and U by ICP-mass spectrometry. Nitrogen and phosphate analysis will be by ion chromatography and will be reported as NO_3 + NO_2 as N and orthophosphate, respectively. Sample preparation for the metals will consist of microwave digestion (GJO Method L-3 and EPA SW-846 Methods 3015 and 3051), and for phosphate and nitrogen will consist of a distilled water leach.

Review and Concurrence:

Kristen McClellen

Kristen McClellen, OU III Project Manager

Task Order Manager Approval to Issue:

Mike Butherus, Manager, Major Projects

Effective Date: January 16, 2001 **Expiration Date:** September 30, 2001

Distribution: Task Order Managers Directive Log
Jalane Glasgow - Record File MRAP 1.3.5
Holders of all affected documents
Tom Kirkpatric (2 copies) - Project Administrative Record

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Program Directive

MMTS - OU III **Program/Project** **Directive No.** MSG-01-02

Task Order No. MAC01-01 (Task No. 350705012)

Initiated By: Kristen McClellen, Project Manager, MACTEC-ERS

Directive Subject: Deletion of work scope to perform a tracer test at the PeRT-slurry walls; abandonment of temporary wells along PeRT slurry walls; addition of wells at the southern and northern ends of the slurry walls to monitor quality of water that is not being funneled to the gate.

Justification and Associated New Task Changes: At the OU III technical meeting held in Moab, Utah, on December 12, 2000, DOE proposed deleting the scope to perform a tracer test and abandoning temporary wells (See Figure 1) at the slurry walls of the PeRT wall. Monitoring data show that wells on the downgradient side of the southern slurry wall have remained essentially dry since installation indicating that there is no measurable flow under the slurry wall and therefore, negating the need to perform a test in this area. However, at the southern slurry wall there does appear to be some wrap around flow at PW-17 as indicated by water level contours (Figure 2) and a saturated thickness at PW-17of ½ ft to 1 ft over the last few monitoring rounds. To determine the ground water flux at the southern slurry wall that is bypassing the gate, three soil borings will be drilled and one new temporary well installed to determine depth to bedrock and saturated thickness in this area. The new well and wells PW-10, PW-17, and PW-23 will be monitored quarterly for water quality in conjunction with the regularly scheduled sampling.

Construction of the northern slurry wall was stopped short because of property owner concerns and therefore, wrap around flow was anticipated and does occur in this area as shown by the water level contours on Figure 2. At the north slurry wall, wells PW-18, PW-20, PW-22, PW-28 and PW99-16 will be retained to monitor water quality that is bypassing treatment by the reactive media and three wells will be abandoned.

Organization(s) Affected: OU III Project team, field sampling personnel and GJO Analytical Laboratory

Affected Documents:

MMTS, OU III, Interim Remedial Action Work Plan for Operable Unit III-Surface Water and Ground Water, October 2000 (MAC-MSG 2.2.1)

Directive: (1) Delete scope in the OU III IRA Work Plan to perform a PeRT-slurry-wall tracer test. (2) Abandon wells PW-01, PW-02, PW-03, PW-04, PW-05, PW-06, PW-07, PW-08, PW-09, PW-11, PW-12, PW-13, PW-14A, PW-15, PW-15A, PW-16A, PW-24, PW-25, PW-26, PW-27, PW-29, and PW-30 along the south slurry wall. (3) Drill at least three soil borings near the southern end of the south slurry wall and install one new temporary well to determine ground water saturated thickness and elevation of the bedrock surface. (4) Complete remaining wells in the PeRT wall area and the new well with flush mount vaults. (5) Sample wells PW-10, PW-14, PW-16, PW-17, PW-18, PW-20, PW-22, PW-23, PW-28, PW99-16, and the new temporary well in conjunction with the regularly scheduled sampling. All activities on this property will be coordinated through the project manager to ensure that the property owner is inconvenienced as little as necessary.

Review and Concurrence:

Farlie Pearl 3/12/01
Farlie Pearl, Quality Assurance Coordinator

OU III Task Order Manager Approval to Issue:

Mike Butherus, Manager, Major Projects

Effective Date: March 15 , 2001 **Expiration Date:** September 30, 2001

Distribution: Task Order Managers Directive Log
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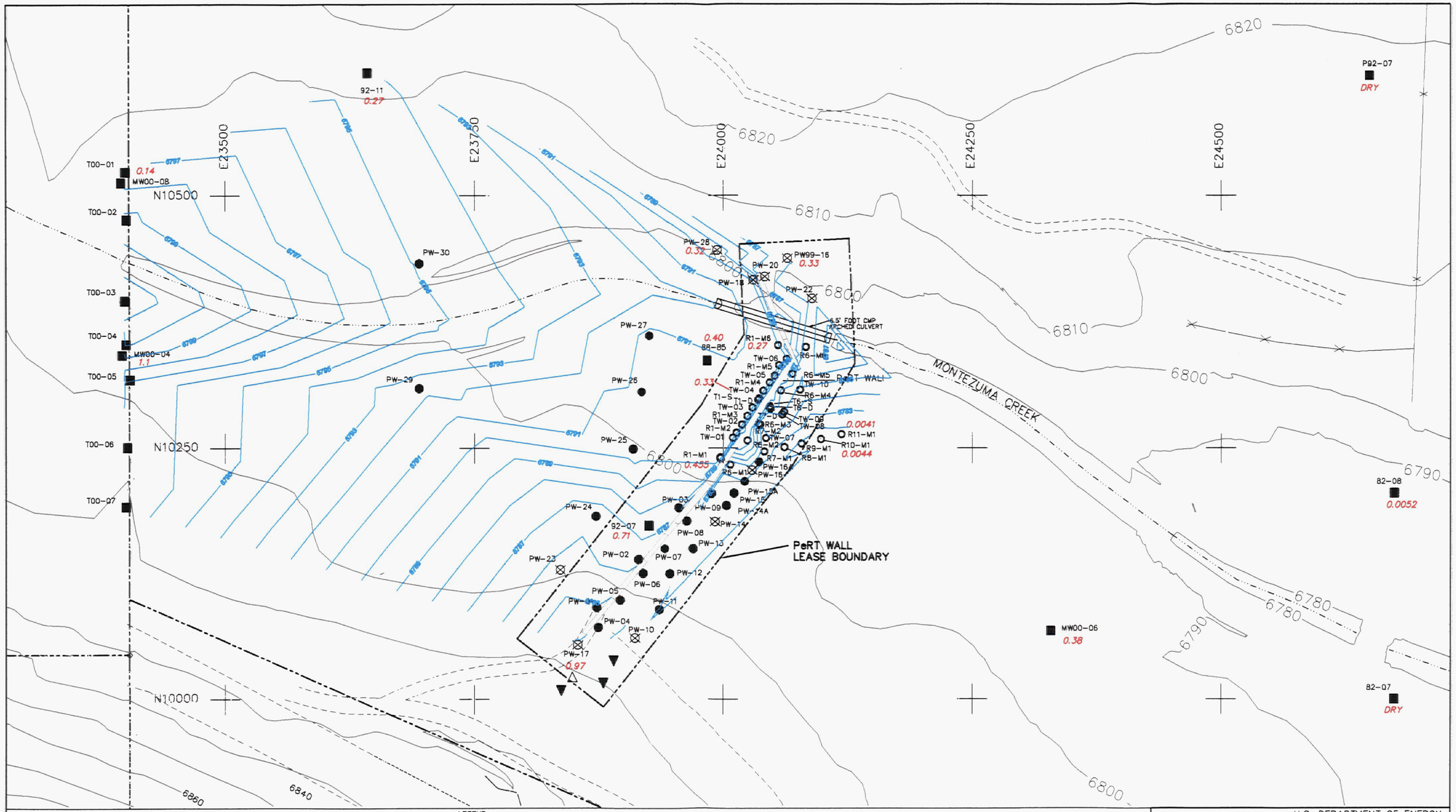

NOTES:

1. GROUND SURFACE AND CREEK PER AS-BUILT PeRT-07-13-2000.DWG.
2. WELLS IN PeRT GATE ARE NOT SHOWN.

LEGEND

- PeRT GATE PERFORMANCE MONITORING WELL TO REMAIN
- SLURRY WALL MONITORING WELL TO BE ABANDONED
- OU III ALLUVIAL MONITORING WELL TO REMAIN
- WATER QUALITY MONITORING WELL FOR SLURRY WALL PERFORMANCE TO REMAIN
- PROPOSED SOIL BORING MONITORING WELL
- PROPOSED SOIL BORING AND NEW MONITOR WELL
- 0.71 URANIUM CONCENTRATION U mg/L, OCTOBER 2000
- 6780 GROUNDWATER CONTOURS

N

SCALE IN FEET

100 50 0 100 200 300

CONTOUR INTERVAL = 2 FEET

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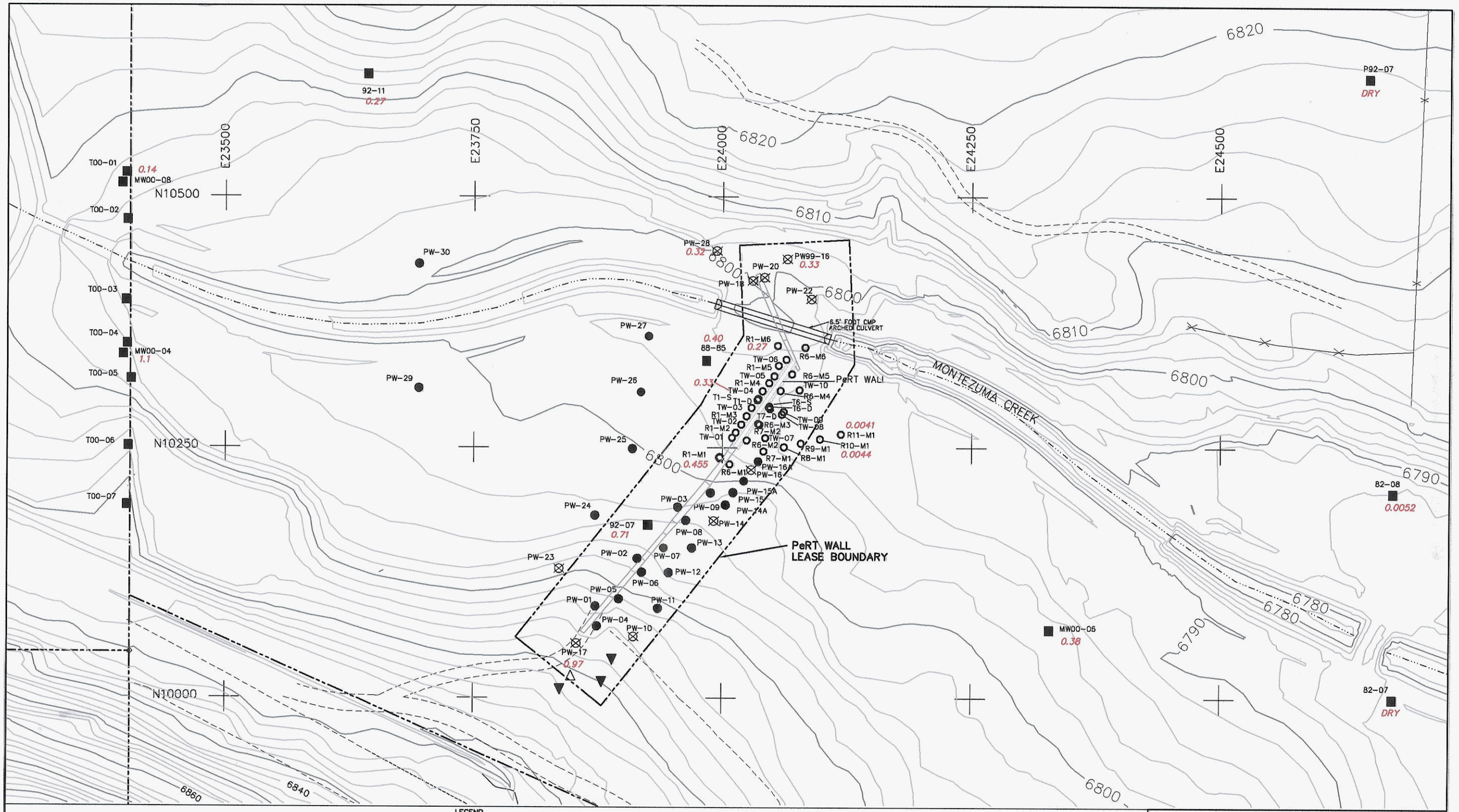
macTec-ers	U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE GRAND JUNCTION, COLORADO
CHANGES TO SLURRY WALL PERFORMANCE WELLS	
DATE PREPARED: MARCH 12, 2001	FILENAME: Q0023400



NOTES:

1. GROUND SURFACE AND CREEK PER AS-BUILT PeRT-07-13-2000.DWG.
2. WELLS IN PeRT GATE ARE NOT SHOWN.

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LEGEND

- PeRT GATE PERFORMANCE MONITORING WELL TO REMAIN
- SLURRY WALL MONITORING WELL TO BE ABANDONED
- OU III ALLUVIAL MONITORING WELL TO REMAIN
- WATER QUALITY MONITORING WELL FOR SLURRY WALL PERFORMANCE TO REMAIN
- PROPOSED SOIL BORING MONITORING WELL
- PROPOSED SOIL BORING AND NEW MONITOR WELL
- 0.71 URANIUM CONCENTRATION U mg/L, OCTOBER 2000

N

SCALE IN FEET

100 50 0 100 200 300

CONTOUR INTERVAL = 2 FEET

macTec-ers

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION OFFICE
GRAND JUNCTION, COLORADO

CHANGES TO SLURRY WALL PERFORMANCE WELLS

DATE PREPARED: MARCH 12, 2001

FILENAME: Q0023400

4-21 (8) OU III AR 576

Program Directive

MMTS - OU III /PeRT **Program/Project** **Directive No.** MSG-01-03

Task Order No. MAC01-01 (Task No. 350705008)

Initiated By: Tim Bartlett, Field Supervisor, MACTEC-ERS

Directive Subject: Modifications to the OU III / PeRT April 2001 water sampling event.

Justification and Associated New Task Changes: (1) Agreements reached with regulators (UDEQ and EPA) following the March, 2001 Federal Facilities meeting regarding ground water sampling locations near the PeRT slurry walls. (2) Continuing for April 2001, the PeRT analyte list specified in Table 5.1-2 of the Monitoring Plan.

Organization(s) Affected: Field sampling personnel and GJO Analytical Laboratory

Affected Documents:

MMTS, OU III, Interim Remedial Action Surface Water and Ground Water Monitoring Plan, Rev. 4, January 2001 (MAC-MSGRAP 1.3.5-1)

- Table 3.1-1
- Figure 3.1-1 and 3.1-2

Directive: Changes to OU III sample locations and clarification to PeRT analyte lists.

(1) OU III: Modification to Ground Water Locations (revised figures for sample locations attached)

a. Add wells PW-10, PW-14, PW-16, PW-18, PW-20, PW-22, and PW-23 near the PeRT slurry walls to the well list for sample collection. Refer to Table 5.1-1of the Monitoring Plan and attached in the Field Data books for sample collection requirements. Note: sample volume may be limited at some of these locations.

b. Delete well PW-11 and PW-15 from the well list.

(2) PeRT analytes: Analytical parameters for the PeRT wells for the April 2001 sampling event are specified in Table 5.1-2 of the Monitoring Plan. Refer to Table 5.1-2 in the plan and attached in the Field Data books for sample collection requirements.

Review and Concurrence:

Kristen McClellen

Kristen McClellen, OU III Project Manager

Farlie Pearl

Farlie Pearl, QA Consultant

Task Order Manager Approval to Issue:

Mike Butherus, Manager, Major Projects

Effective Date: April 9, 2001 **Expiration Date:** September 30, 2001

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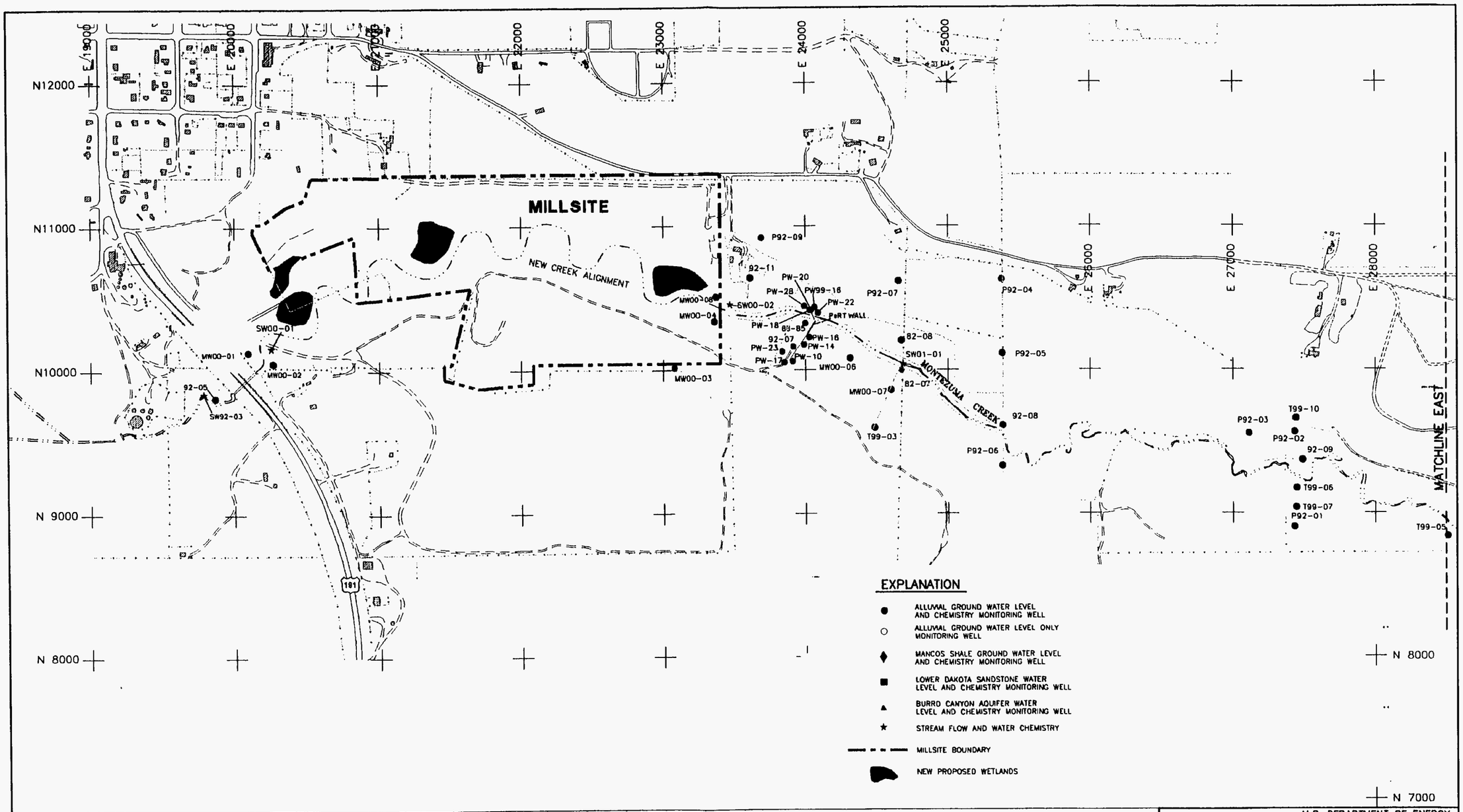
T. Kirkpatrick



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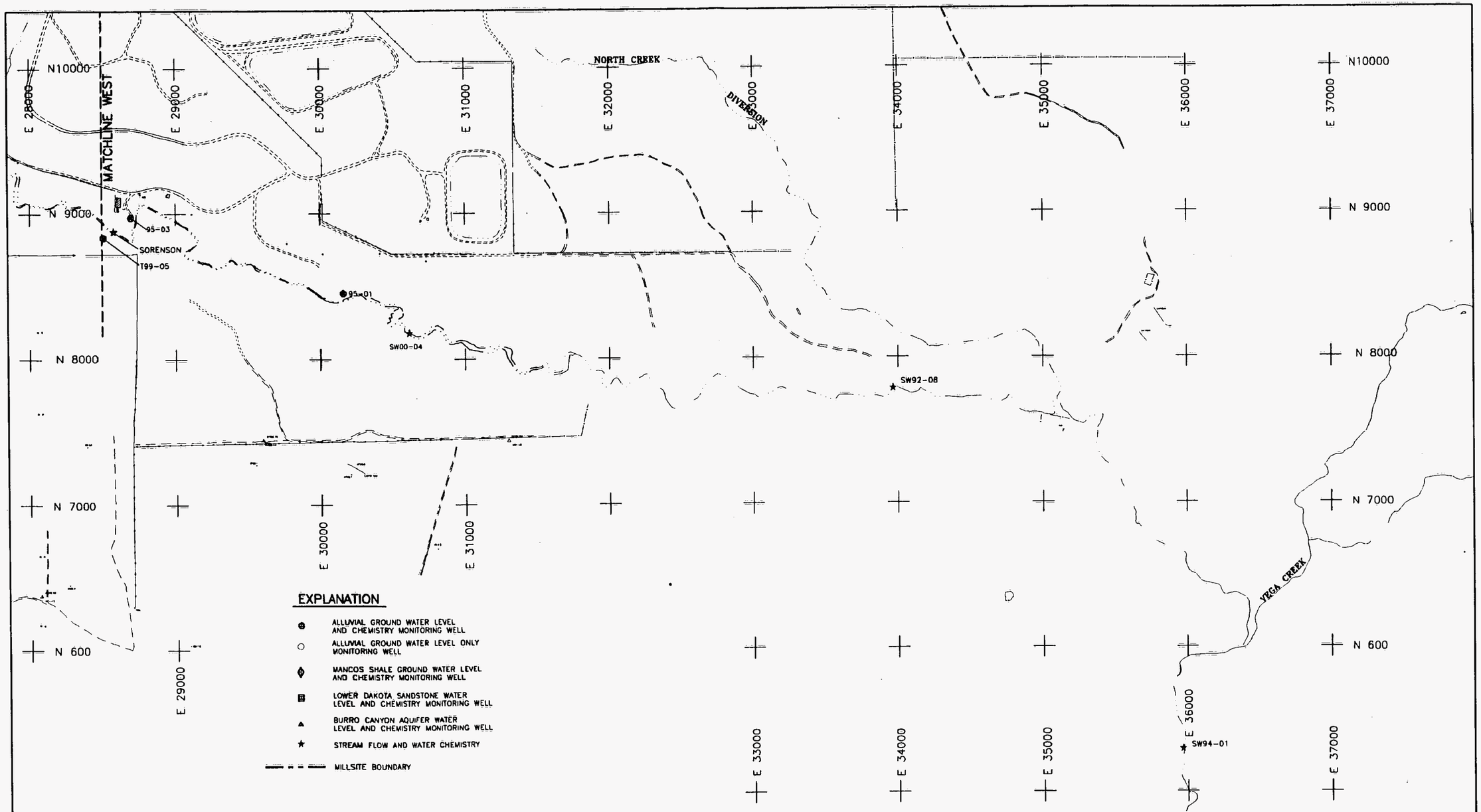
macTec-ers	U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE GRAND JUNCTION, COLORADO
APRIL 2001 WATER QUALITY SAMPLING LOCATIONS WEST	
DATE PREPARED: MARCH 19, 2001	FILENAME: Q0023600



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macTec-ers

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION OFFICE
GRAND JUNCTION, COLORADO

APRIL 2001 WATER QUALITY SAMPLING LOCATIONS EAST

DATE PREPARED: MARCH 19, 2001

FILENAME: Q0023700

Program Directive

MMTS - OU III **Program/Project** **Directive No.** MSG-01-04

Task Order No. MAC01-01 (Task No. 350705012)

Initiated By: Tim Bartlett, Hydrogeologist, MACTEC-ERS

Directive Subject: Locations for soil borings and temporary well installations on the millsite.

Justification and Associated New Task Changes:
Soil samples will be collected at the locations identified in this directive to better characterize contaminant concentrations in subpile soil. The area of investigation is the northeast corner of the former East Tailings Pile, in and around the construction staging area. Soil sampling will be conducted because 1) the area may not have been sufficiently characterized previously in the IRA, 2) the area was not over-excavated beyond the radiological standard to remove secondary source material, as were other large subpile areas on the millsite, and 3) the soil may locally affect water quality at seeps near the area of interest (see attached map). Soil characterization data was used to guide soil removal during millsite remediation, and continues to be used in evaluating the subpile vadose zone as a secondary source of groundwater contamination.

The soil sampling will occur in conjunction with installation of temporary OU III IRA monitor wells. The work scope and rationale for the installation of new temporary wells on the post-remediation millsite is detailed in the OU III IRA Work Plan. The work is anticipated to occur between early June and mid July 2001, as soon as there will be no interference with site grading/construction activities and prior to re-vegetation of upland areas. The proposed locations of the soil borings and wells are shown on the attached map. Three soil sample locations will completed as boreholes only (no well installation) from which soils will be collected. Soil samples will be collected from three other locations where a temporary well will also be installed. Each borehole will be advanced using direct push technology (Geoprobe). Continuous samples will be collected to bedrock refusal. Three samples from each borehole will be submitted for laboratory analysis for the constituents and by the methods listed in Section 5.2 of the IRA work plan. The samples will be from the upper, middle, and lower horizons of the vadose zone encountered at each location. Field personnel will ensure that a sample of each material type encountered is submitted. Samples will not be collected from beneath the water table.

The locations of the new temporary wells shown in the attached map differ slightly from the proposed locations shown in the work plan (Section 5.7). These changes update the groundwater characterization task on the basis of actual site conditions, which were unknown at the time the work plan was written.

Organization(s) Affected: Field sampling personnel and GJO Analytical Laboratory

Affected Documents:

MMTS, OU III, Interim Remedial Action Work Plan, October 2000 (MAC-MSG 2.21)

Directive: Additional vadose zone sampling and changes to locations for temporary well installations.
(1) Perform soil sampling at the locations shown in the attached figure according to the vadose zone soil sampling procedures described in Section 5.2 of the OU III IRA Work Plan.

(2) Install temporary wells on the millsite at locations shown in the attached figure according to procedures described in Section 5.7 of the OU III IRA Work Plan.

Review and Concurrence:

Kristen McClellen, OU III Project Manager

Farlie Pearl, QA Consultant

Task Order Manager Approval to Issue:

Mike Butherus, Manager, Major Projects

Effective Date: June 1, 2001 **Expiration Date:** September 30, 2001

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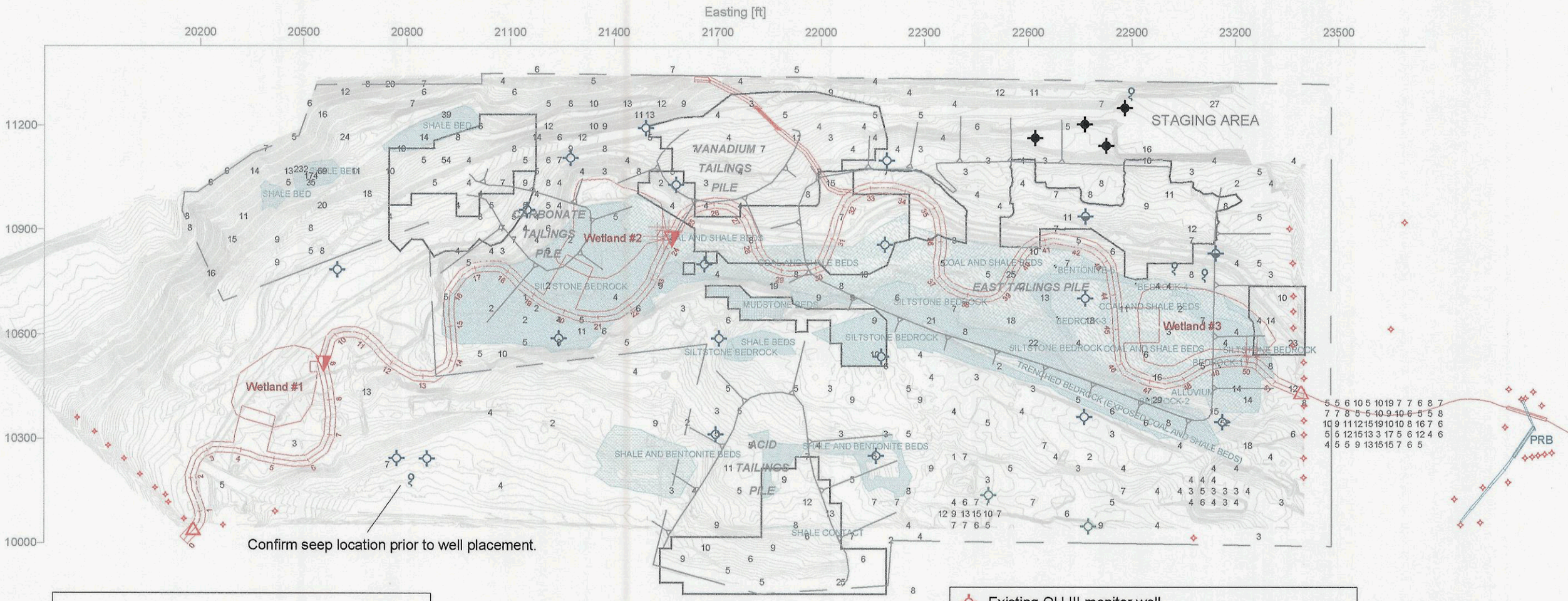
Tom Kirkpatrick

Attachment
MMTS - OU III
Program Directive MSG-01-04
June 2001



- 5 Surface Uranium [pCi/g]
- Bottom of Excavation Contour, 2-ft interval
- Original Pile Areas
- Areas Excavated to Bedrock
- Constructed Creek/Aquifer Corridor, Wetlands/Galleries
- Residual Vadose Zone (RVZ) Removal Area

- Existing OU III monitor well
- Proposed monitor well location with subpile soil sampling
- Proposed monitor well location
- Proposed Deer Draw monitor well location
- Proposed subpile soil sample location: 1 location w/ groundwater saturation will be completed as a monitoring well.
- Groundwater seep
- Existing OU III surface water monitoring location
- Proposed new OU III surface water monitoring location

Program Directive

MMTS - OU III **Program/Project** **Directive No.** MSG-01-05

Task Order No. MAC01-01 (Task No. 350705008)

Initiated By: Tim Bartlett, Hydrogeologist, MACTEC-ERS

Directive Subject: Modifications to the OU III/PeRT July 2001 and FY02 sampling events.

Justification and Associated New Task Changes: Agreements reached with regulators (UDEQ and EPA) following the June 14, 2001 OU III technical meeting regarding sampling locations and analytes.

Organization(s) Affected: Field sampling personnel and GJO Analytical Laboratory

Affected Documents:

MMTS, OU III, Interim Remedial Action Surface Water and Ground Water Monitoring Plan, Rev.4, January 2001 (MAC-MSGRAP 1.3.5-1)

Directive: Changes to the OU III sample locations and to the OU III and PeRT analyte lists.

(1) Modification to the OU III ground water and surface water sampling locations listed in Table 3.1-1 of the Monitoring Plan. New locations are listed in Attachment 1 and shown on the attached figure.

(2) Modification to Table 5.1-1 of the Monitoring Plan listing the analytical parameters for OU III locations. Analytical parameters are shown on the last page of Attachment 1.

(3) Revision of OU III field parameter measurements to include DO and ORP at wells 92-07, 92-11, and 88-85 **only**. (Note: DO and ORP are still field parameters at PeRT wells).

(4) Modification of the PeRT well location and analyte list tables in the Monitoring Plan (Table 3.2-1-1 and 5.1-3, respectively) to those listed in Attachment 2.

Review and Concurrence:

Kristen McClellen 7/5/01
Kristen McClellen, OU III Project Manager

Farlie Pearl July 8, 2001
Farlie Pearl, QA Consultant

Task Order Manager Approval to Issue:

MC Butherus 7/8/01
Mike Butherus, Manager, Major Projects

Effective Date: July 9, 2001 **Expiration Date:** November 30, 2001

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Program Directive MSG-01-05, Attachment 1
Monticello OU III Ground Water and Surface Water Sample Locations and Frequency for Annual Monitoring
Effective July 2001 and FY 2002 (Table 3.1-1 revised)

SAMPLING LOCATION			IRA ANNUAL MONITORING[a]			
General Location	Description	Location ID	January	April	July	October
Upgradient	Alluvial	92-05[b]			X	X
	Burro Canyon	92-06[b]				X
	Dakota Sandstone	92-13[b]				X
	Montezuma Creek	SW92-03[b]			X	X
Millsite	Alluvial	82-20				X
		MW00-01		X	X	X
		MW00-02		X	X	X
		MW00-03		X		X
		MW00-04 (T00-04)	X	X	X	X
		T00-01	X	X	X	X
		T01-01	X	X	X	X
		T01-02	X	X	X	X
		T01-04	X	X	X	X
		T01-06	X	X	X	X
		T01-07	X	X	X	X
		T01-08	X	X	X	X
		T01-12	X	X	X	X
		T01-13	X	X	X	X
		T01-18	X	X	X	X
		T01-19	X	X	X	X
		T01-20	X	X	X	X
		T01-23	X	X	X	X
		T01-24	X	X	X	X
		T01-26	X	X	X	X
		T01-27	X	X	X	X
		T01-28	X	X	X	X
	Burro Canyon	93-01				X
	Mancos Shale	31SW93-200-4				X
	Montezuma Creek	SW00-01		X	X	X
		SW00-02	X	X	X	X
		SW01-02	X	X	X	X
		SW01-03	X	X	X	X
	Millsite Seeps	Seep 1	X	X	X	X
		Seep 2	X	X	X	X
		Seep 3	X	X	X	X
		Seep 4	X	X	X	X
Downgradient	Alluvial	PW-10	X	X	X	X
		PW-14	X	X	X	X
		PW-16	X	X	X	X
		PW-17	X	X	X	X
		PW-18	X	X	X	X
		PW-20	X	X	X	X
		PW-22	X	X	X	X
		PW-23	X	X	X	X
		PW-28	X	X	X	X
		PW99-16	X	X	X	X

Program Directive MSG-01-05, Attachment 1 (continued)
Monticello OU III Ground Water and Surface Water Sample Locations and Frequency for Annual Monitoring
Effective July 2001 and FY 2002 (Table 3.1-1 revised)

SAMPLING LOCATION			IRA ANNUAL MONITORING[a]			
General Location	Description	Location ID	January	April	July	October
Downgradient	Alluvial	MW00-06	X	X	X	X
		MW00-07	X	X	X	X
		82-07	X	X	X	X
		82-08	X	X	X	X
		88-85	X	X	X	X
		92-07	X	X	X	X
		92-08		X	X	X
		92-09		X		X
		92-11	X	X	X	X
		95-01				X
		95-03				X
		T99-03		X		X
		P92-02		X		X
		P92-03		X		X
		P92-04[b]				X
		P92-05				X
		P92-06		X	X	X
		P92-07[b]				X
		P92-09				X
	Burro Canyon	95-02				X
		95-04				X
		95-06[c]				X
		31NE93-205[c]				X
		92-10				X
	Burro Canyon/Dakota	83-70				X
	Dakota Sandstone	92-12				X
		95-07[c]				X
	Montezuma Creek	SW01-01	X	X	X	X
		Sorenson	X	X	X	X
		SW00-04		X		X
		SW92-08		X		X
		SW94-01		X		X

[a] Listed locations and sample requirements are subject to change through Program Directives.
[b] Abandon well; discontinue surface water monitoring after 10/01 data review.
[c] After 10/01 sample only in years prior to CERCLA 5-Year review.

List of OU III Surface Water and Ground Water Sample and Measurement Locations July 2001[3]

Surface Water[2]	Ground Water[1]	Ground Water	Ground Water	Ground Water	WL Only	WL Only
SW92-03	83-70 [1]	T99-03	31SW93-200-4	82-07	T99-05	T00-02
SW00-01	92-06 [1]	T00-01	MW00-01	82-08	T99-06	T00-03
SW01-02	92-10 [1]	T01-01	MW00-02	82-20	T99-07	T00-04[4]
SW01-03	92-12 [1]	T01-02	MW00-03	88-85	T99-10	T00-05
SW00-02	92-13 [1]	T01-04	MW00-04[4]	92-05	T01-03	T00-06
SW01-01	93-01 [1]	T01-06	MW00-06	92-07	T01-05	T00-07
Sorenson	95-01 [1]	T01-07	MW00-07	92-08	T01-09	T00-08
SW00-04	95-02 [1]	T01-08	PW-10	92-09	T01-10	T00-09
SW92-08	95-03 [1]	T01-12	PW-14	92-11	T01-11	T00-10
SW94-01	95-04 [1]	T01-13	PW-16	P92-02	T01-15	T00-11
Seep 1	95-06 [1]	T01-18	PW-17	P92-03	T01-16	T00-12
Seep 2	95-07 [1]	T01-19	PW-18	P92-04	T01-17	T00-13
Seep 3	95-08 [1]	T01-20	PW-20	P92-05	T01-22	T00-14
Seep 4	31NE93-205 [1]	T01-23	PW-22	P92-06	T01-25	T00-15
		T01-24	PW-23	P92-07	P92-01	31SW93-200-1
		T01-26	PW-28	P92-09	31SW93-197-2	31SW93-200-2
		T01-27	PW99-16		31SW93-197-3	31SW93-200-3
		T01-28			31SW93-197-4	MW00-08
					31SW93-197-5	

Water level measurements will be recorded for all wells listed above. Shaded locations are water level measurements only.
Stream flow will only be measured at surface water locations that are sampled.
Seep flows may be measured or estimated depending on site conditions

Sample Containers, Preservation, Holding Times, and Analytical Parameters for OU III Water Samples

Analytical Parameter	Container Type / Size	Preservation	Holding Time
Metals (As, Fe, Mn, Mo, Se, Th-230, U, V)	HDPE 500mL	Filter by 0.45-µm filter; HNO_3 to pH<2	6 Months
Major Cations (Ca, Mg, K, and Na) (from same bottles as metals)	HDPE - See metals		
Major Anions (Cl, F, and SO_4)	HDPE 125 mL	Filter by 0.45-µm filter; Cool to 4° C	28 Days
Nitrate/Nitrite (NO_3 + NO_2 as N)	HDPE 125 mL	Filter by 0.45-µm filter; Cool to 4° C; H_2SO_4 to pH<2	28 Days
Phosphate (PO_4 as P) [from same bottles as Nitrate (No_3 + NO_2 as N)]	HDPE – See Nitrate/Nitrite		
Total Dissolved Solids (filterable residue)	HDPE 125 mL	Cool to 4° C	7 Days
Gross Alpha/Gross Beta	HDPE 1 L	*Ground Water*: filter by 0.45-µm filter; *Surface Water*: unfiltered; HNO_3 to pH<2	6 Months
U-234, and U-238[1] (*Ground Water:* from same bottle as metals)	HDPE - See metals		
U-234, and U-238[2] (*Surface Water*)	HDPE 1 L	*Surface Water*: unfiltered HNO_3 to pH<2	6 Months

[1] Isotopic uranium (U-234 and U-238) analysis will be conducted on samples from bedrock and 95-series alluvial wells. Include these analytes with the 500ml metals/Cations sample. Identify the analytes on the sample label, ticket, and the Chain of Custody.
[2] Collect a 1 Liter sample unfiltered for Isotopic Uranium (U-234 and U-238) analyses at all surface water sites. Measure stream flow at all surface water locations that are sampled during April, July and October.
[3] Record water level measurements of all of all wells not scheduled to be sampled including Millsite temporary wells i.e., T00-xx and T01-xx
[4] Collect samples from T00-04 if it has a greater saturated interval than MW00-04.

Program Directive MSG-01-05, Attachment 2
Monticello PeRT Well Sample Locations and Analytes July 2001

Sampling Locations and Analytical Parameters for Gate Performance Monitoring (Table 3.2.1-1 revised)

PeRT Well No.	**Metals**[1] (As, Fe, Mn, Mo, Se, U, V) **and Cations** (Ca, K, Mg, and Na)	**Anions** (Cl, F, SO_4)	**Nitrate/Nitrite** (NO_3 + NO_2 as N)	**Ammonium**[2] (NH_4 as N)	**Ra-226**
R1–M1	X	X	X	X	7/01
R1–M2	X	X	X	X	
R1–M3	X	X	X	X	
T1–S	X	X	X	X	
T1–D	X	X	X	X	
R1–M4	X	X	X	X	
R1–M5	X	X	X	X	7/01
R1–M6	X	X	X	X	
R2–M1	X	X	X	X	
R2–M2	X	X	X	X	
R2–M3	X	X	X	X	
R2–M4	X	X	X	X	
R2–M5	X	X	X	X	
T2–S	X	X	X	X	
T2–D	X	X	X	X	
R2–M6	X	X	X	X	
R2–M7	X	X	X	X	
R2–M8	X	X	X	X	
R2–M9	X	X	X	X	
R2–M10	X	X	X	X	
R3–M1	X	X	X	X	
R3–M2	X	X	X	X	
T3–S	X	X	X	X	
T3–D	X	X	X	X	
R3–M3	X	X	X	X	
R3–M4	X	X	X	X	
R4–M1	X	X	X	X	
R4–M2	X	X	X	X	
R4–M3	X	X	X	X	
R4–M4	X	X	X	X	
T4–S	X	X	X	X	
T4–D	X	X	X	X	
R4–M5	X	X	X	X	
R4–M6	X	X	X	X	
R4–M7	X	X	X	X	
R4–M8	X	X	X	X	
R5–M1	X	X	X	X	
R5–M2	X	X	X	X	7/01
R5–M3	X	X	X	X	
R5–M4	X	X	X	X	
R5–M5	X	X	X	X	
T5–S	X	X	X	X	
T5–D	X	X	X	X	
R5–M6	X	X	X	X	
R5–M7	X	X	X	X	
R5–M8	X	X	X	X	
R5–M9	X	X	X	X	7/01
R5–M10	X	X	X	X	

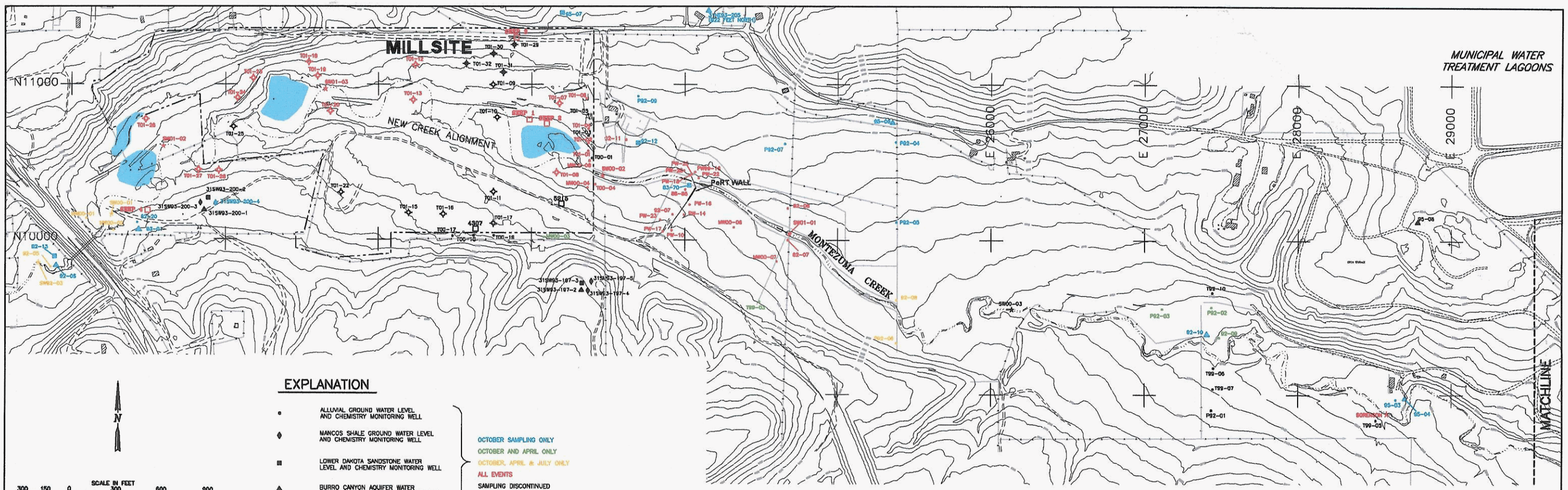
Program Directive MSG-01-05, Attachment 2 (continued)
Monticello PeRT Well Sample Locations and Analytes July 2001

PeRT Well No.	Metals[1] (As, Fe, Mn, Mo, Se, U, V) and Cations (Ca, K, Mg, and Na)	Anions (Cl, F, SO_4)	Nitrate/Nitrite (NO_3 + NO_2 as N)	Ammonium[2] (NH_4 as N)	Ra-226
R6–M1	X	X	X	X	
R6–M2	X	X	X	X	
R6–M3	X	X	X	X	
T6–S	X	X	X	X	
T6–D	X	X	X	X	7/01
R6–M4	X	X	X	X	
R6–M5	X	X	X	X	
R6–M6	X	X	X	X	
R7-M2	X	X	X	X	
T7-D	X	X	X	X	7/01
R7–M1	X	X	X	X	
R8–M1	X	X	X	X	
R9–M1	X	X	X	X	
R10–M1	X	X	X	X	
R11-M1	X	X	X	X	
TW-01	X	X	X	X	
TW-02	X	X	X	X	
TW-03	X	X	X	X	
TW-04	X	X	X	X	
TW-05	X	X	X	X	
TW-06	X	X	X	X	
TW-07	X	X	X	X	
TW-08	X	X	X	X	
TW-09	X	X	X	X	
TW-10	X	X	X	X	
TW-11	X	X	X	X	
TW-12	X	X	X	X	
TW-13	X	X	X	X	
TW-14	X	X	X	X	

[1] Cations may be combined in the same container with the metals sample aliquot and will be identified on the sample ticket and label.
[2] The samples submitted for ammonium analysis will be identified on the sample ticket and label as Ammonium (NH_4 as N) and may be combined with the Nitrate/Nitrite sample aliquot.

Analytical Parameters, Containers, Preservation and Holding Times (Table 5.1-3 revised)

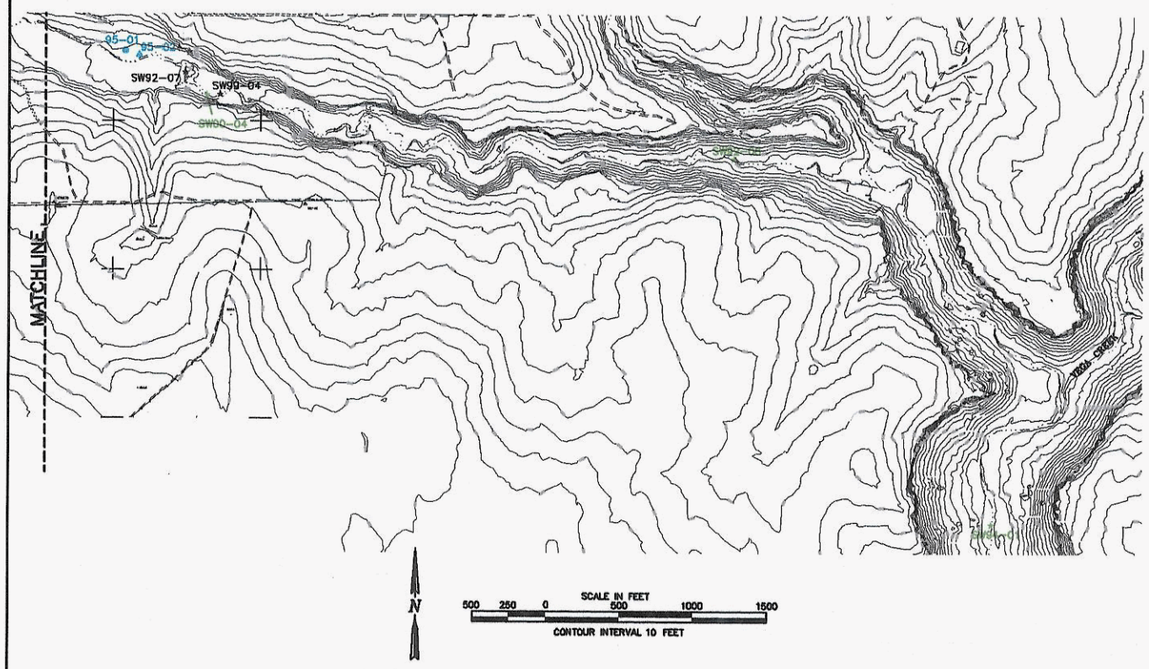
Analyte	Container (Type / Size)	Preservation	Holding time
Metals (As, Fe, Mn, Mo, Se, U, V)	HDPE 500ml	HNO_3 to pH < 2	6 months
Cations[1] (Ca, K, Mg, and Na) (from same bottle as Metals)	See Metals		
Anions (Cl, F, SO_4)	HDPE 125ml	Filtered by 0.45 µm filter Cool to 4° C	28 days
Nitrate/Nitrite (NO_3 + NO_2 as N)	HDPE 125ml	Filtered by 0.45 µm filter Cool to 4° C H_2SO_4 to pH < 2	28 days
Ammonium (NH_4 as N)[2] (from same bottle as NO_3 + NO_2 as N)	See Nitrate/Nitrite		
Ra-226	HDPE 1 L	HNO_3 to pH < 2	6 months



EXPLANATION

- ALLUVIAL GROUND WATER LEVEL AND CHEMISTRY MONITORING WELL
- MANCOS SHALE GROUND WATER LEVEL AND CHEMISTRY MONITORING WELL
- LOWER DAKOTA SANDSTONE WATER LEVEL AND CHEMISTRY MONITORING WELL
- BURRO CANYON AQUIFER WATER LEVEL AND CHEMISTRY MONITORING WELL
- STREAM FLOW AND WATER CHEMISTRY
- NEW WELL INSTALLED JUNE 2001
- BOREHOLE SAMPLE LOCATION
- MILLSITE BOUNDARY
- NEW PROPOSED WETLANDS

- OCTOBER SAMPLING ONLY
- OCTOBER AND APRIL ONLY
- OCTOBER, APRIL & JULY ONLY
- ALL EVENTS
- SAMPLING DISCONTINUED



GROUND WATER AND SURFACE WATER SAMPLING LOCATIONS AND FREQUENCY

SAMPLING LOCATION			IRA ANNUAL MONITORING[a]			
General Location	Description	Location ID	January	April	July	October
Upgradient	Alluvial	92-05[b]			X	X
	Burro Canyon	92-06[b]				X
	Dakota Sandstone	92-13[b]				X
	Montezuma Creek	SW92-03[b]			X	X
Millsite	Alluvial	92-20				X
		MW00-01		X	X	X
		MW00-02		X	X	X
		MW00-03		X		X
		MW00-04 (T00-04)	X	X	X	X
		T00-01	X	X	X	X
		T01-01	X	X	X	X
		T01-02	X	X	X	X
		T01-04	X	X	X	X
		T01-06	X	X	X	X
		T01-07	X	X	X	X
		T01-09	X	X	X	X
		T01-12	X	X	X	X
		T01-13	X	X	X	X
		T01-18	X	X	X	X
		T01-19	X	X	X	X
		T01-20	X	X	X	X
		T01-23	X	X	X	X
		T01-24	X	X	X	X
		T01-26	X	X	X	X
		T01-27	X	X	X	X
		T01-28	X	X	X	X
	Burro Canyon	93-01				X
	Mancos Shale	31SW93-200-4				X
	Montezuma Creek	SW00-01		X	X	X
		SW00-02	X	X	X	X
		SW01-02	X	X	X	X
		SW01-03	X	X	X	X
	Millsite Seeps	Seep 1	X	X	X	X
		Seep 2	X	X	X	X
		Seep 3	X	X	X	X
		Seep 4	X	X	X	X
Downgradient	Alluvial	PW-10	X	X	X	X
		PW-14	X	X	X	X
		PW-16	X	X	X	X
		PW-17	X	X	X	X
		PW-18	X	X	X	X
		PW-20	X	X	X	X
		PW-22	X	X	X	X
		PW-23	X	X	X	X
		PW-28	X	X	X	X
		PW99-16	X	X	X	X

SAMPLING LOCATION			IRA ANNUAL MONITORING[a]			
General Location	Description	Location ID	January	April	July	October
Downgradient	Alluvial	MW00-06	X	X	X	X
		MW00-07	X	X	X	X
		92-07	X	X	X	X
		92-08	X	X	X	X
		86-85	X	X	X	X
		92-07	X	X	X	X
		92-08		X	X	X
		92-09		X		X
		92-11	X	X	X	X
		95-01				X
		95-03				X
		T99-03		X		X
		P92-02		X		X
		P92-03		X		X
		P92-04[b]				X
		P92-05				X
		P92-06		X	X	X
		P92-07[b]				X
		P92-09				X
	Burro Canyon	95-02				X
		95-04				X
		86-86[b]				X
		31NE93-205[b]				X
		92-10				X
	Burro Canyon/Dakota	83-70				X
	Dakota Sandstone	92-12				X
		85-07[b]				X
	Montezuma Creek	SW01-01	X	X	X	X
		Sorenson	X	X	X	X
		SW00-04		X		X
		SW92-09		X		X
		SW94-01		X		X

[a] Listed locations and sample requirements are subject to change through Program Directives.
[b] Abandon well; discontinue surface water monitoring after 10/01 data review.
[c] After 10/01 sample only in years prior to CERCLA 5-Year review.

NOTES:
ABANDON MILLSITE BEDROCK WELLS 31SW93-200-1, -200-2, AND -200-3 DURING NEXT PHASE OF WELL ABANDONMENT.
ABANDON DOWNGRADIENT ALLUVIAL WELLS P92-01, T99-06, T99-07, AND T99-10 BECAUSE THEY ARE DRY.
ABANDON DOWNGRADIENT ALLUVIAL WELL T99-05, BECAUSE IT PROVIDES DUPLICATE INFORMATION TO WELL 95-03.
ABANDON CROSS-GRADIENT BEDROCK WELLS 31SW93-197-2, -197-3, -197-4, -197-5 DURING NEXT PHASE OF WELL ABANDONMENT.

macTec-ers	U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE GRAND JUNCTION, COLORADO
Figure 1	WELL AND SURFACE WATER LOCATION MAP
DATE PREPARED: JUNE 27, 2001	FILENAME: Q0024200

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Program Directive

MMTS - OU III **Program/Project** **Directive No.** MSG-01-06

Task Order No. MAC02-01 (Task No. 360705008)

Initiated By: Kristen McClellen, Project Manager, MACTEC-ERS

Directive Subject: New Millsite well installations and modifications to the sample and measurement locations and field and analytical parameters for the OU III October 2001 sampling event.

Justification and Associated New Task Changes:

1. New well installations: Drill five core holes, two of which will be installed as monitor wells, to characterize the aquifer near the lower end of Steele Draw and in the area upgradient of Wetland #3.
2. Changes to sample locations and analytes: Agreements reached with DOE and the regulators (UDEQ and EPA) following the June 14, 2001 OU III technical meeting and June 27, 2001 FFA meeting regarding sampling locations and analytes. Additionally, as of October 2001 the PeRT gate performance monitoring and associated wells fall under the management of the OU III project. Review of the first two years worth of monitoring data indicate that the gate is performing as expected and that the intensity of monitoring can be scaled back.

Organization(s) Affected: Field sampling personnel and GJO Analytical Laboratory

Affected Documents: MMTS, *OU III, Interim Remedial Action Surface Water and Ground Water Monitoring Plan*, Rev. 4, January 2001 (MAC-MSGRAP 1.3.5-1)

Directive:

Drilling and well installation task: Using the geoprobe rig to core to bedrock at (5) locations on the Millsite shown in Attachment 4 (T01-033 to T01-037). Two of the locations (to be determined in the field) will be completed as monitor wells. Sampling and water level measurements at those locations will be coordinated with the field teams and will commence in October 2001.

Changes to the OU III and PeRT sample locations and analytes lists:

1. Modifications to the schedule for OU III groundwater and surface water sampling locations listed in Table 3.1-1 of the Monitoring Plan. New locations are listed in Attachment 1 and shown on the figure in Attachment 4.
2. Modifications to Table 5.1-1 of the Monitoring Plan listing the analytical parameters for OU III locations. Analytical parameters are listed in Attachment 2, along with a summary list of the sampling and measurement locations scheduled for October 2001.
3. Revision of the OU III field parameter measurements to include DO and ORP at wells 92-07, 92-11, and 88-85 **only**. (Note: DO and ORP are still field parameters at PeRT wells. Also note that DO measurements require a high-range test or low-range test as appropriate)
4. Change the sample and measurement locations and analytes for PeRT wells from those listed in Table 3.2.1-1 and 5.1-3 in the Monitoring Plan to those listed in Attachment 3.

This directive MSG-01-06 and the listed attachments supersede and cancel Directive MSG-01-05.

List of attachments:

Attachment 1: Schedule of OU III Sample Locations for FY2002
Attachment 2: Tables identifying OU III sample and measurement locations and analytical parameters and preservation requirements
Attachment 3: Tables identifying PeRT well Sample and Measurement Locations and analytical parameters and preservation requirements
Attachment 4: Sample and measurement location map

Review and Concurrence:

Farlie Pearl 10/3/01
Farlie Pearl, QA Consultant

Task Order Manager Approval to Issue:

10/3/01
Mike Buthgrus, Manager, Major Projects

Effective Date: October 8, 2001

Expiration Date: January 8, 2002

Distribution: w/ Attachments (4)
MMTS Task Order Managers Directive Log
Jalane Glasgow - Record File MRAP 1.3.5
Holders of all affected document
Tom Kirkpatrick (2 copies) - Project Administrative Record

Monticello Program Directive MSG-01-06
Attachment 1. Schedule of OU III Sample Locations for FY 2002

SAMPLING LOCATION			IRA ANNUAL MONITORING[a] FY 2002			
General Location	Description	Location ID	October	January	April	July
Upgradient	Alluvial	92-05[b]	X			
	Burro Canyon	92-06[b]	X			
	Dakota Sandstone	92-13[b]	X			
	Montezuma Creek	SW92-03[b]	X			
Millsite[c]	Alluvial	82-20	X			
		MW00-01	X		X	X
		MW00-02	X		X	X
		MW00-03	X		X	
		T00-01	X	X	X	X
		T00-04	X	X	X	X
		T01-01	X	X	X	X
		T01-02	X	X	X	X
		T01-04	X	X	X	X
		T01-05	X	X	X	X
		T01-06	X	X	X	X
		T01-07	X	X	X	X
		T01-08	X	X	X	X
		T01-09	X	X	X	X
		T01-10	X	X	X	X
		T01-12	X	X	X	X
		T01-13	X	X	X	X
		T01-18	X	X	X	X
		T01-19	X	X	X	X
		T01-20	X	X	X	X
		T01-23	X	X	X	X
		T01-24	X	X	X	X
		T01-25	X	X	X	X
		T01-26	X	X	X	X
		T01-27	X	X	X	X
		T01-28	X	X	X	X
	Burro Canyon	93-01	X			
	Mancos Shale	31SW93-200-4	X			
	Montezuma Creek	SW00-01	X		X	X
		SW00-02	X	X	X	X
		SW01-02	X	X	X	X
		SW01-03	X	X	X	X
	Millsite Seeps	Seep 1	X	X	X	X
		Seep 2	X	X	X	X
		Seep 3	X	X	X	X
		Seep 4	X	X	X	X
Downgradient	Alluvial (vicinity of PeRT Wall)	PW-10	X	X	X	X
		PW-14	X	X	X	X
		PW-16	X	X	X	X
		PW-17	X	X	X	X
		PW-18	X	X	X	X
		PW-20	X	X	X	X
		PW-22	X	X	X	X
		PW-23	X	X	X	X
		PW-28	X	X	X	X
		PW99-16	X	X	X	X

SAMPLING LOCATION			IRA ANNUAL MONITORING[a] FY 2002			
General Location	Description	Location ID	October	January	April	July
	Alluvial PeRT Wall wells	R1-M3	X	X	X	X
		R1-M4	X	X	X	X
		R2-M4	X	X	X	X
		R2-M7	X	X	X	X
		R4-M3	X	X	X	X
		R4-M6	X	X	X	X
		R6-M2	X	X	X	X
		R6-M3	X	X	X	X
		T6-D	X	X	X	X
		R6-M4	X	X	X	X
		R6-M5	X	X	X	X
		R9-M1	X	X	X	X
		R10-M1	X	X	X	X
		R11-M1	X	X	X	X
	Alluvial	MW00-06	X	X	X	X
		MW00-07	X	X	X	X
		82-07	X	X	X	X
		82-08	X	X	X	X
		88-85	X	X	X	X
		92-07	X	X	X	X
		92-08	X		X	X
		92-09	X		X	
		92-11	X	X	X	X
		95-01	X			
		95-03	X			
		T99-03	X		X	
		P92-02	X		X	
		P92-03	X		X	
		P92-04[b]	X			
		P92-05	X			
		P92-06	X		X	X
		P92-07[b]	X			
		P92-09	X			
	Burro Canyon	95-02	X			
		95-04	X			
		95-06[d]	X			
		31NE93-205[d]	X			
		92-10	X			
	Burro Canyon/Dakota	83-70	X			
	Dakota Sandstone	92-12	X			
		95-07[d]	X			
	Montezuma Creek	SW01-01	X	X	X	X
		Sorenson	X	X	X	X
		SW00-04	X		X	
		SW92-08	X		X	
		SW94-01	X		X	

[a] Listed locations and sample requirements are subject to change through Program Directives.

[b] Abandon well; discontinue surface water monitoring after 10/01 data review.

[c] Geoprobe drilling will commence the week of 10/15/01. New wells and sample locations (T01-3x) will be added at that time.

[d] After 10/01 sample only in years prior to CERCLA 5-Year review.

Monticello Program Directive MSG-01-06
Attachment 2. Table of OU III Analytical Parameters and Preservation Requirements
and List of October 2001 Sample and Water Level Locations

Analytical Parameters, Containers, Preservation and Holding Times:

Analytical Parameter[1]	Container (Type / Size)		Preservation	Holding Time
Metals (As, Fe, Mn, Mo, Se, U, V)	HDPE	500mL	Filter by 0.45- m filter; HNO_3 to pH<2	6 Months
Major Cations (Ca, Mg, K, and Na) (from same bottles as metals)	See metals			
Major Anions (Cl, F, and SO_4)	HDPE	125 mL	Filter by 0.45- m filter; Cool to 4° C	28 Days
Nitrate + Nitrite (NO_3 + NO_2 as N)	HDPE	125 mL	Filter by 0.45- m filter; Cool to 4° C; H_2SO_4 to pH<2	28 Days
Gross Alpha/Gross Beta	HDPE	1 L	*Ground Water*: filter by 0.45- m filter; *Surface Water*: unfiltered; HNO_3 to pH<2 (both GW and SW)	6 Months
Total Dissolved Solids (filterable residue)[2] (*Surface Water* only)	HDPE	125 mL	Cool to 4° C	7 Days
Isotopic Uranium (U-234, and U-238)[3] (*Surface Water* only)	HDPE	1 L	(Unfiltered) HNO_3 to pH<2	6 Months

[1] Collect the following samples at the seep locations: metals, cations, anions, nitrate+nitrite (NO_3 + NO_2 as N)
[2] Collect a sample for TDS analysis from surface water locations only
[3] Collect a 1 Liter sample unfiltered for Isotopic Uranium (U-234 and U-238) analyses at all surface water sites.

List of OU III Surface Water and Ground Water Sample and Measurement Locations October 2001

Surface Water[1]	Ground Water[2]	Ground Water	Ground Water	Ground Water	WL Only[3]	WL Only[3]
SW92-03	82-07	P92-05	MW00-01	T01-19	P92-01	T00-05
SW00-01	82-08	P92-06	MW00-02	T01-20	31SW93-197-2	T00-06
SW01-02	82-20	P92-07	MW00-03	T01-23	31SW93-197-3	T00-07
SW01-03	83-70	P92-09	MW00-06	T01-24	31SW93-197-4	T00-08
SW00-02	88-85	93-01	MW00-07	T01-25	31SW93-197-5	T00-09
SW01-01	92-05	31NE93-205	T01-01	T01-26	31SW93-200-1	T00-10
Sorenson	92-06	31SW93-200-4	T01-02	T01-27	31SW93-200-2	T00-11
SW00-04	92-07	95-01	T01-04	T01-28	31SW93-200-3	T00-12
SW92-08	92-08	95-02	T01-05	PW-10	95-08	T00-13
SW94-01	92-09	95-04	T01-06	PW-14	T99-05	T00-14
Seep 1	92-10	95-03	T01-07	PW-16	T99-06	T00-15
Seep 2	92-11	95-06	T01-08	PW-17	T99-07	T01-03
Seep 3	92-12	95-07	T01-09	PW-18	T99-10	T01-11
Seep 4	92-13	T99-03	T01-10	PW-20	MW00-04	T01-15
	P92-02	T00-01	T01-12	PW-22	MW00-08	T01-16
	P92-03	T00-04	T01-13	PW-23	T00-02	T01-17
	P92-04		T01-18	PW-28	T00-03	T01-22
				PW99-16		

[1] Stream flow will be measured at surface water locations that are sampled. Seep flows may be measured or estimated depending on site conditions.
[2] Two new sample locations (T01-3x) will be sampled in October. Drilling will commence the week of 10/15/01. Field determinations will be made during that time as to the locations and their ID number. Sampling will be coordinated between the field teams.
[3] Water level measurements will be recorded for all wells listed above. Shaded locations are water level measurements only.

Monticello Program Directive MSG-01-06
Attachment 3. List of OU III (PeRT well) Sample and Water Level Measurement Locations and Table of Analytical Parameters and Preservation Requirements

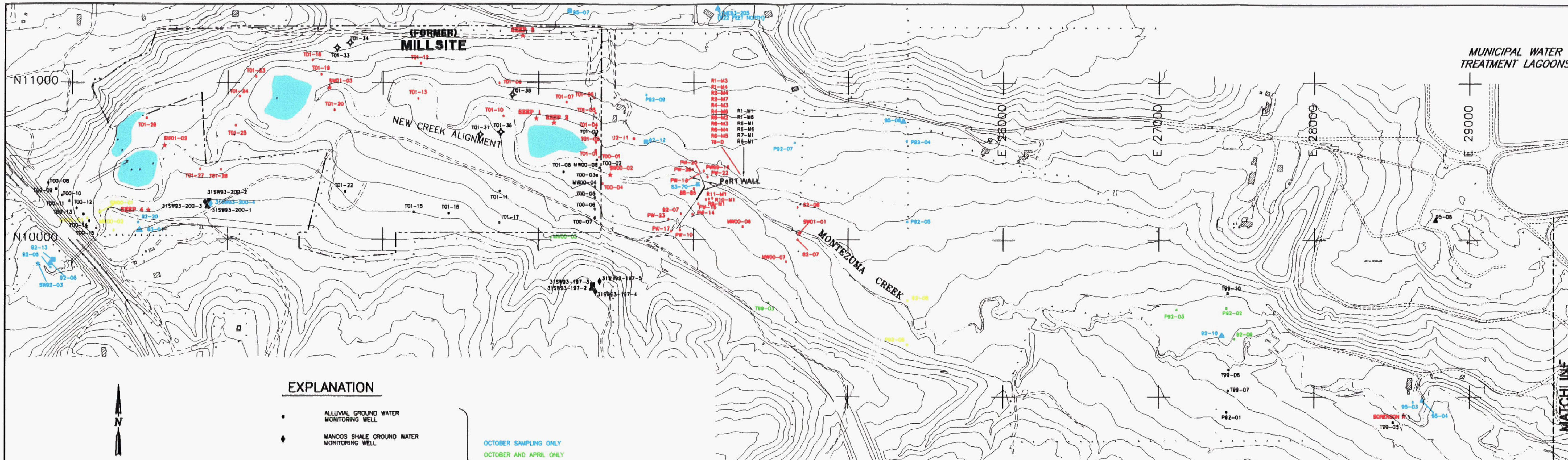
PeRT Wells to be Sampled[1]		Water Level Measurements Only
R1–M3	R6–M2	R1-M1
R1–M4	R6–M3	R6-M1
	T6-D	R7-M1
R2-M4	R6–M4	R8M1
R2-M7	R6–M5	R1-M6
		R6-M6
R4–M3	R9–M1	
R4–M6	R10–M1	
	R11-M1	

[1] Water level measurements will be obtained for all wells that are sampled in addition to the wells listed for water level measurements only.

Analytical Parameters, Containers, Preservation and Holding Times:

Analyte	Container (Type / Size)	Preservation	Holding Time
Metals (As, Fe, Mn, Mo, Se, U, V)	HDPE 500ml	Filtered by 0.45 µm filter HNO_3 to pH < 2	6 months
Cations[1] (Ca, K, Mg, and Na) (combined with Metals)	See Metals		
Anions (Cl, F, SO_4)	HDPE 125ml	Filtered by 0.45 µm filter Cool to 4° C	28 days
Nitrate + Nitrite (NO_3 + NO_2 as N)	HDPE 125ml	Filtered by 0.45 µm filter Cool to 4° C H_2SO_4 to pH < 2	28 days

[1] Cations may be combined in the same container with the metals sample and will be identified on the sample ticket and label

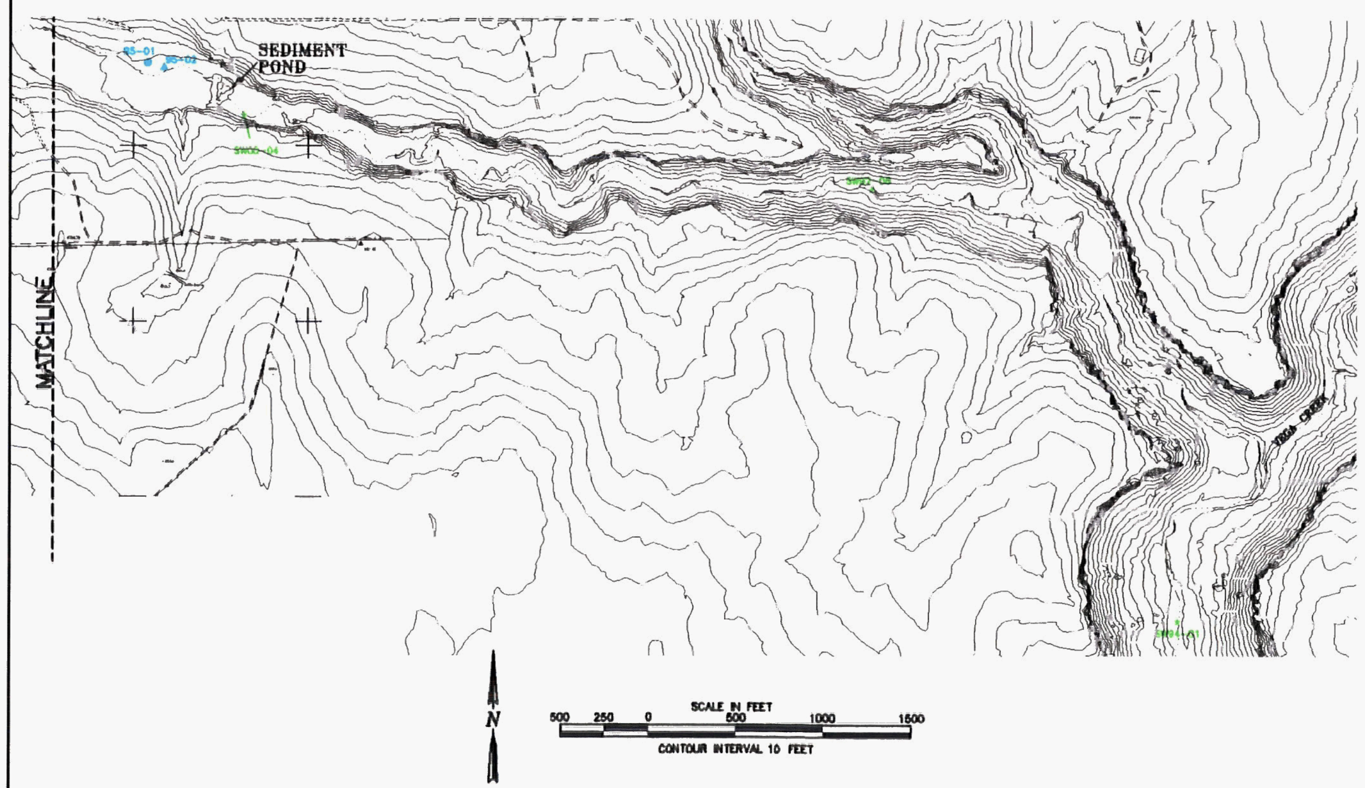


EXPLANATION

Symbol	
•	ALLUVIAL GROUND WATER MONITORING WELL
♦	MANCOS SHALE GROUND WATER MONITORING WELL
■	LOWER DAKOTA SANDSTONE GROUND WATER MONITORING WELL
▲	BURRO CANYON AQUIFER GROUND WATER MONITORING WELL
★	SURFACE WATER CHEMISTRY LOCATION
✧	PROPOSED COREHOLE, 2 LOCATIONS TO BE COMPLETED AS WELLS AND SAMPLED IN IN OCTOBER 2001
— · —	FORMER MILLSITE BOUNDARY
	NEW WETLAND AREA

OCTOBER SAMPLING ONLY
OCTOBER AND APRIL ONLY
OCTOBER, APRIL & JULY ONLY
ALL EVENTS
SAMPLING DISCONTINUED–WATER LEVEL MEASURED

SCALE IN FEET 300 150 0 300 600 900
CONTOUR INTERVAL 10 FEET



SAMPLING LOCATION			IRA ANNUAL MONITORING[a] FY 2002			
General Location	Description	Location ID	October	January	April	July
Upgradient	Alluvial	92-05[b]	X			
	Burro Canyon	92-06[b]	X			
	Dakota Sandstone	92-13[b]	X			
	Montezuma Creek	SW92-03[b]	X			
Millsite[c]	Alluvial	92-20	X			
		MW00-01	X		X	X
		MW00-02	X		X	X
		MW00-03	X		X	
		T00-01	X	X	X	X
		T00-04	X	X	X	X
		T01-01	X	X	X	X
		T01-02	X	X	X	X
		T01-04	X	X	X	X
		T01-05	X	X	X	X
		T01-06	X	X	X	X
		T01-07	X	X	X	X
		T01-08	X	X	X	X
		T01-09	X	X	X	X
		T01-10	X	X	X	X
		T01-12	X	X	X	X
		T01-13	X	X	X	X
		T01-18	X	X	X	X
		T01-19	X	X	X	X
		T01-20	X	X	X	X
		T01-23	X	X	X	X
		T01-24	X	X	X	X
		T01-25	X	X	X	X
		T01-26	X	X	X	X
		T01-27	X	X	X	X
		T01-28	X	X	X	X
	Burro Canyon	93-01	X			
	Mancos Shale	31SW93-200-4	X			
	Montezuma Creek	SW00-01	X		X	X
		SW00-02	X	X	X	X
		SW01-02	X	X	X	X
		SW01-03	X	X	X	X
	Millsite Seeps	Seep 1	X	X	X	X
		Seep 2	X	X	X	X
		Seep 3	X	X	X	X
		Seep 4	X	X	X	X
Downgradient	Alluvial (vicinity of PeRT Wall)	PW-10	X	X	X	X
		PW-14	X	X	X	X
		PW-16	X	X	X	X
		PW-17	X	X	X	X
		PW-18	X	X	X	X
		PW-20	X	X	X	X
		PW-22	X	X	X	X
		PW-23	X	X	X	X
		PW-26	X	X	X	X
		PW99-16	X	X	X	X

SAMPLING LOCATION			IRA ANNUAL MONITORING[a] FY 2002			
General Location	Description	Location ID	October	January	April	July
Downgradient	Alluvial (PeRT Wall Wells)	R1-M3	X	X	X	X
		R1-M4	X	X	X	X
		R2-M4	X	X	X	X
		R2-M7	X	X	X	X
		R4-M3	X	X	X	X
		R4-M6	X	X	X	X
		R6-M2	X	X	X	X
		R6-M3	X	X	X	X
		T6-D	X	X	X	X
		R6-M4	X	X	X	X
		R6-M5	X	X	X	X
		R9-M1	X	X	X	X
		R10-M1	X	X	X	X
		R11-M1	X	X	X	X
	Alluvial	MW00-06	X	X	X	X
		MW00-07	X	X	X	X
		82-07	X	X	X	X
		82-08	X	X	X	X
		88-85	X	X	X	X
		92-07	X	X	X	X
		92-08	X		X	X
		92-09	X		X	
		92-11	X	X	X	X
		95-01	X			
		95-03	X			
		T99-03	X		X	
		P92-02	X		X	
		P92-03	X		X	
		P92-04[b]	X			
		P92-05	X			
		P92-06	X		X	X
		P92-07[b]	X			
		P92-09	X			
	Burro Canyon	95-02	X			
		95-04	X			
		95-06[d]	X			
		31NE93-205[d]	X			
	Burro Canyon/Dakota	92-10	X			
	Dakota Sandstone	83-70	X			
		92-12	X			
	Montezuma Creek	95-07[d]	X			
		SW01-01	X	X	X	X
		Sorenson	X	X	X	X
		SW00-04	X		X	
		SW92-08	X		X	
		SW94-01	X		X	

[a] Listed locations and sample requirements are subject to change through Program Directives.
[b] Abandon well, discontinue surface water monitoring after 10/01 data review.
[c] Geoprobe drilling will commence the week of 10/15/01. New wells and sample locations (T01-3x) will be added at that time.
[d] After 10/01 sample only in years prior to CERCLA 5-Year review.

NOTES:
ABANDON MILLSITE BEDROCK WELLS 31SW93-200-1, -200-2, AND -200-3 DURING NEXT PHASE OF WELL ABANDONMENT.
ABANDON DOWNGRADIENT ALLUVIAL WELLS P92-01, T99-06, T99-07, AND T99-10 BECAUSE THEY ARE DRY.
ABANDON DOWNGRADIENT ALLUVIAL WELL T99-05, BECAUSE IT PROVIDES DUPLICATE INFORMATION TO WELL 95-03.
ABANDON CROSS-GRADIENT BEDROCK WELLS 31SW93-197-2, -197-3, -197-4, -197-5 DURING NEXT PHASE OF WELL ABANDONMENT.
WATER LEVELS WILL BE MEASURED AT ALL WELL LOCATIONS DURING EACH SAMPLING EVENT. SURFACE WATER FLOW MEASUREMENTS WILL BE FIELD LOCATED IN THE PROXIMITY OF THE SAMPLING LOCATION DEPENDENT ON CURRENT FLOW CONDITIONS.

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U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION OFFICE
GRAND JUNCTION, COLORADO

PLATE 1 WELL AND SURFACE WATER LOCATION MAP

DATE PREPARED: OCTOBER 4, 2001

FILENAME: Q0024200

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421 (12) OUIII AR 576

Program Directive

MMTS - OU III **Program/Project** **Directive No.** MSG-01-07

Task Order No. MAC02-01 (Task No. 360705012)

Initiated By: Kristen McClellen, Project Manager, MACTEC-ERS

Directive Subject: A one-time sampling event to sample seeps in the vicinity of the millsite.

Justification and Associated New Task Changes: Agreements reached with DOE and the regulators (UDEQ and EPA) at the November 14 and 15, 2001 FFA meeting regarding additional sampling of seeps peripheral to the millsite to document the range of selenium in groundwater/surface water in the areas unaffected by millsite remediation and restoration.

Organization(s) Affected: Field sampling personnel and GJO Analytical Laboratory

Affected Documents:

MMTS, OU III, Interim Remedial Action Surface Water and Ground Water Monitoring Plan, Rev.4, January 2001 (MAC-MSGRAP 1.3.5-1)

Directive:

(1) Collect surface water (seep) samples from the following specific areas: Steels's pond influent and effluent, Wetland 3, Seep 1, 2, and 3, the seep entering Somerville's pond, Sutherland pond, seep south of the water treatment lagoons, Upper North Drainage seep, effluent from culvert that empties into Wetland 2, and the North Draw seeps. See attached map for locations.

(2) Perform field reconnaissance and sampling at any other areas with significant flow or that appear to at times carry significant flow.

(3) Submit all samples for the analytical parameters are listed below.

OU III Analytical Parameters, Containers, Preservation, and Holding Times:

Analytical Parameter	Container (Type / Size)	Preservation	Holding Time
Metals (As, Fe, Mn, Mo, Se, U, V)	HDPE 500mL	Filter by 0.45-µm filter; HNO_3 to pH<2	6 Months
Nitrate + Nitrite (NO_3 + NO_2 as N)	HDPE 125 mL	Filter by 0.45-µm filter; Cool to 4° C; H_2SO_4 to pH<2	28 Days

List of attachments:

Attachment 1: Map of seep sample locations

Review and Concurrence:

Farlie Pearl

Farlie Pearl, QA Consultant

Task Order Manager Approval to Issue:

Mike Buthepus, Manager, Major Projects

Effective Date: November 19, 2001 **Expiration Date:** January 31, 2002

Distribution: w/ Attachment
Task Order Managers Directive Log
Jalane Glasgow - Record File MRAP 1.3.5
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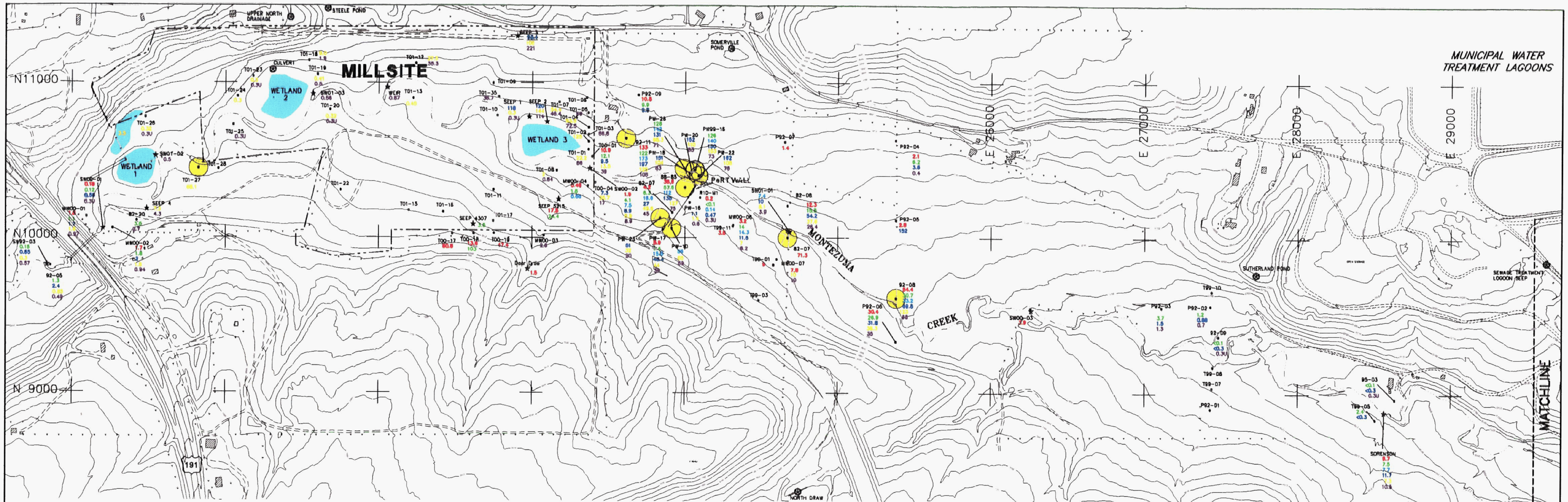


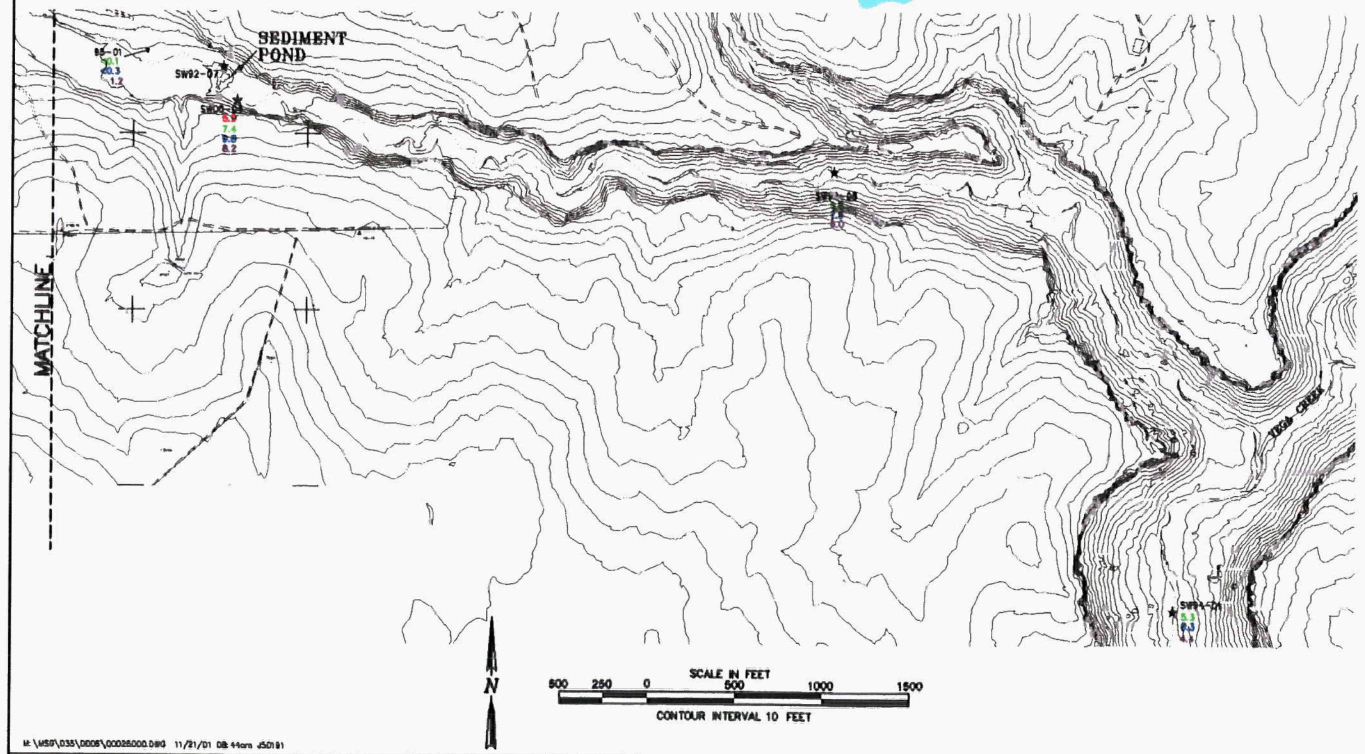
EXPLANATION

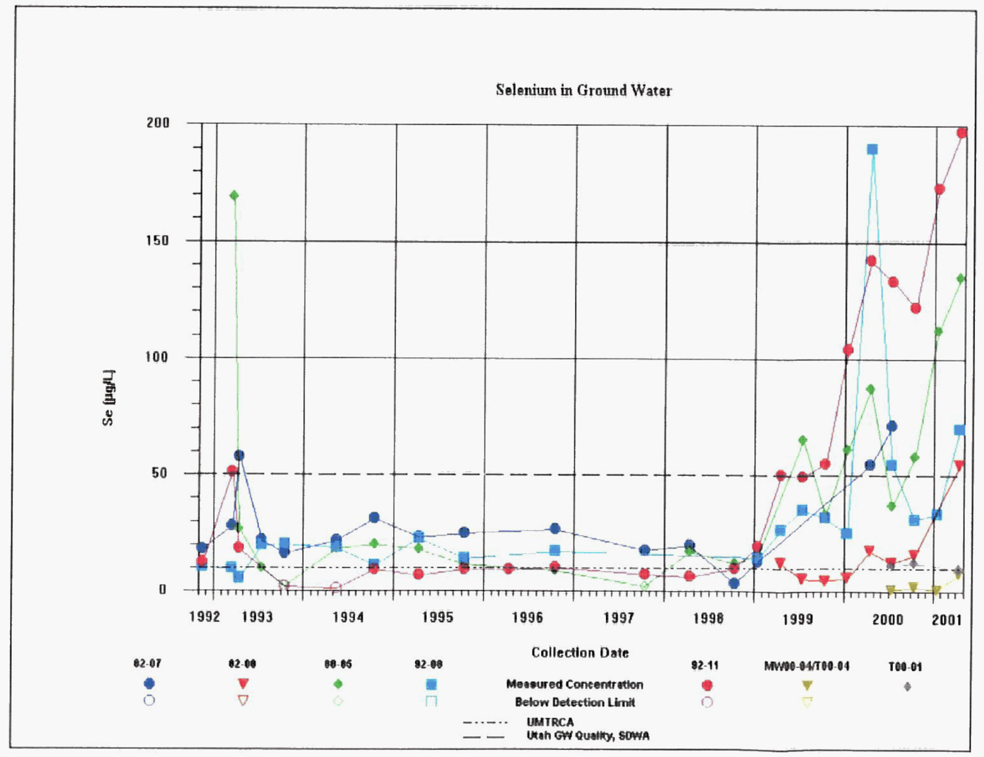
- APPROXIMATE SEEP SAMPLING LOCATION
- SURFACE WATER LOCATION
- ALLUVIAL GROUND WATER MONITORING WELL

SELENIUM CONCENTRATION μg/L

- 133 JULY 2000 DATA
- 44 JULY 01
- 122 OCTOBER 2000 DATA
- 8.2 OCTOBER 01
- 173 JANUARY 2001 DATA
- 197 APRIL 2001 DATA
- LOCATIONS WHERE THE UTAH STANDARD IS TYPICALLY EXCEEDED
- MILLSITE BOUNDARY
- APPROXIMATE EXTENT OF ALLUVIAL AQUIFER
- NEW WETLAND AREA

NOTE:
SELENIUM CONCENTRATIONS EXCEED THE UTAH GROUND WATER AND SAFE DRINKING WATER ACT STANDARD (50μg/L) AT 88-85, 92-11, PW99-16 PW-18, PW-20, PW-22, PW-23, PW-28, AND 82-07.





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U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION OFFICE
GRAND JUNCTION, COLORADO

SEEP SAMPLING LOCATIONS

DATE PREPARED: NOVEMBER 21,2001

FILENAME: Q0026000

421 (13) OU III AR 576

Program Directive

MMTS - OU III **Program/Project** **Directive No.** MSG-01-08

Task Order No. MAC02-01 (Task No. 360705012)

Initiated By: Kristen McClellen, Project Manager, MACTEC-ERS

Directive Subject: Conduct a pumping test to determine hydraulic characteristics of PRB (Permeable Reactive Barrier).

Justification and Associated New Task Changes: Agreements reached with DOE and the regulators (UDEQ and EPA) at the November 14 and 15, 2001 FFA meeting regarding need to determine hydraulic properties of PRB wall reactive media and flux through reactive media.

Organization(s) Affected: Monticello Groundwater and GJO Analytical Laboratory

Affected Documents

MMTS, OU III, Interim Remedial Action Work Plan for Operable Unit III - Surface Water and Ground Water, October 2000 (MAC-MSG 2.2.1)

Directive:

(1) Conduct 72-hour drawdown test and 24-hour recovery test in PRB. Use existing horizontal sparge line in downgradient gravel zone as withdrawl point and existing wells for water level monitoring.

(2) Determine maximum sustainable yield of PRB through variable discharge step-drawdown test.

(3) Monitor water levels in wells throughout tests using pressure tranducers with automated data logging, and manual measurement. Monitor water levels in wells in the ZVI, up- and downgradient gravel zones, and up- and downgradient native alluvium, including wells at end of north and south slurry walls. About 12 to 15 transducers/loggers are anticipated to be available for the tests.

(4) Collect samples of the effluent water 2 times daily during drawdown test for laboratory analysis by GJO Analytical Chemistry Laboratory of dissolved metals listed in Table 1. Measure pH, oxidation-reduction potential, alkalinity, temperature, and electrical conductivity when samples are collected and up to 4-times daily.

Table 1. Analytical Parameters, Containers, Preservation, and Holding Times for Pumping Test Effluent Samples

Analytical Parameter	Container (Type / Size)	Preservation	Holding Time
Metals (As, Fe, Mn, Mo, Se, U, V)	HDPE 500mL	Filter by 0.45-µm filter; HNO_3 to pH<2	6 Months

Review and Concurrence:

Farlie Pearl, QA Consultant

Task Order Manager Approval to Issue:

Mike Butherus, Manager, Major Projects

Effective Date: November 19, 2001 **Expiration Date:** January 31, 2002

Distribution:

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4-21 (A) OU III AR 576

Program Directive

MMTS - OU III **Program/Project** **Directive No.** MSG-02-01

Task Order No. MAC02-01 (Task No. 360705008)

Initiated By: Kristen McClellen, Project Manager, MACTEC-ERS

Directive Subject: Modifications to the sample and measurement locations and field and analytical parameters for the OU III calendar year (CY) 2002 sampling events.

Justification and Associated New Task Changes:

1. Changes to sample locations and analytes: Agreements reached with DOE and the regulators (UDEQ and EPA) following the June 14, 2001 OU III technical meeting, the June 27 and November 14, 2001 FFA meetings regarding sampling locations and analytes, and a conference call with UDEQ on January 7, 2002.
2. Additionally, as of October 2001 the PeRT gate performance monitoring and associated wells fall under the management of the OU III project. Review of the first two years worth of monitoring data indicate that the gate is performing as expected and that the intensity of monitoring can be scaled back.
3. Top of casing well elevations have changed due to Millsite reconstruction and flush mounting of wells at some locations.

Organization(s) Affected: Field sampling personnel and GJO Analytical Laboratory

Affected Documents: MMTS, *OU III, Interim Remedial Action Surface Water and Ground Water Monitoring Plan*, Rev. 4, January 2001 (MAC-MSGRAP 1.3.5-1)

Directive: Changes to the OU III measurement and sample locations and analytes lists:

1. Modifications to the schedule for OU III groundwater and surface water sample and measurement locations listed in Tables 3.1-1, 3.2.1-1and 4.6-1and Figures 3.1-1, 3.1-2, 3.2-1, 3.2-2 of the Monitoring Plan. The updated locations and frequencies are listed in Attachment 1 and shown on the figure in Attachment 3.
2. At the former PeRT wall and gate performance monitoring area (Figures 3.2-1 and 3.2-2), water level measurements will only be obtained at the locations scheduled to be sampled (Attachment 1) and at wells R1-M1, R6-M1, R7-M1, R8-M1, R1-M6 and R6-M6. Monitoring is discontinued at all other former PeRT locations.
3. Modifications to Table 5.1-1, 3.2.1-1 and 5.1-3 of the Monitoring Plan listing the analytical parameters for OU III and former PeRT well locations. Analytical parameters are listed in Attachment 2.
4. Revise the OU III field parameter measurements to include DO and ORP at wells 92-07, 92-11, and 88-85 **only**. (Note: DO and ORP are still field parameters at the former PeRT wells that are sampled. Also note that DO measurements require a high-range test or low-range test as appropriate)
5. Sample and measurement locations based on the changes authorized by this directive are shown on the figure in Attachment 3.
6. Disregard well depth information contained in Appendix B "Well Completion Information" of the Plan. Measure and record *total depth* and *depth to water* at all well locations.
7. Discontinue sampling and measurements (stream flow and water levels) at all surface water and ground water locations west of Highway 191.
8. During January only, collect a surface water sample from scheduled Monticello Creek sample locations for Total Ammonia (NH_3) analysis. These samples may be obtained from the same container as the sample collected for Nitrate/Nitrite analysis. Refer to Attachment 2 for analytical requirements.
9. At the direction of DOE, the Annual Monitoring Plan will not be revised this year. Any changes to the plan will continue to be documented through Program Directives.

This directive, MSG-02-01, and the listed attachments supersede and cancel Directive MSG-01-06.

List of attachments:

Attachment 1: Schedule of OU III Sample and Measurement Locations for FY2002, updated 1/03/02.
Attachment 2: Analytical Requirements for OU III Surface Water and Ground Water Samples.
Attachment 3: Sample and Measurement Location Map.

Review and Concurrence:

Farlie Pearl, QA Consultant

Task Order Manager Approval to Issue:

Mike Butherus, Manager, Major Projects

Effective Date: January 21, 2002

Expiration Date: October 31, 2002

Distribution: w/ Attachments (3)
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Attachment 1. Schedule of OU III Sample and Measurement Locations for CY 2002 (updated 1/03/02)

SAMPLING LOCATION			IRA ANNUAL MONITORING[a] CY 2002			
General Location	Description	Location ID[b]	January	April	July	October
Former Millsite	Alluvial	82-20				X
		MW00-01		X	X	X
		MW00-02		X	X	X
		MW00-03		X		X
		T00-01	X	X	X	X
		T00-04	X	X	X	X
		T01-01	X	X	X	X
		T01-02	X	X	X	X
		T01-04	X	X	X	X
		T01-05	X	X	X	X
		T01-06	X	X	X	X
		T01-07	X	X	X	X
		T01-08	X	X	X	X
		T01-09	X	X	X	X
		T01-10	X	X	X	X
		T01-12	X	X	X	X
		T01-13	X	X	X	X
		T01-18	X	X	X	X
		T01-19	X	X	X	X
		T01-20	X	X	X	X
		T01-23	X	X	X	X
		T01-24	X	X	X	X
		T01-25	X	X	X	X
		T01-26	X	X	X	X
		T01-27	X	X	X	X
		T01-28	X	X	X	X
		T01-35	X	X	X	X
	Burro Canyon	93-01				X
	Mancos Shale	31SW93-200-4				X
	Montezuma Creek	SW00-01		X	X	X
		SW00-02	X	X	X	X
		SW01-02	X	X	X	X
		SW01-03	X	X	X	X
	Millsite Seeps	Seep 1	X	X	X	X
		Seep 2	X	X	X	X
		Seep 3	X	X	X	X
Downgradient	Alluvial (vicinity of PeRT Wall)	PW-10	X	X	X	X
		PW-14	X	X	X	X
		PW-16	X	X	X	X
		PW-17	X	X	X	X
		PW-18	X	X	X	X
		PW-20	X	X	X	X
		PW-22	X	X	X	X
		PW-23	X	X	X	X
		PW-28	X	X	X	X
		PW99-16	X	X	X	X

SAMPLING LOCATION			IRA ANNUAL MONITORING[a] CY 2002			
General Location	Description	Location ID[b]	January	April	July	October
Downgradient	Alluvial (PeRT wells)	R1-M3	X	X	X	X
		R1-M4	X	X	X	X
		R2-M4	X	X	X	X
		R2-M7	X	X	X	X
		R4-M3	X	X	X	X
		R4-M6	X	X	X	X
		R6-M2	X	X	X	X
		R6-M3	X	X	X	X
		T6-D	X	X	X	X
		R6-M4	X	X	X	X
		R6-M5	X	X	X	X
		R9-M1	X	X	X	X
		R10-M1	X	X	X	X
		R11-M1	X	X	X	X
	Alluvial	MW00-06	X	X	X	X
		MW00-07	X	X	X	X
		82-07	X	X	X	X
		82-08	X	X	X	X
		88-85	X	X	X	X
		92-07	X	X	X	X
		92-08		X	X	X
		92-09		X		X
		92-11	X	X	X	X
		95-01				X
		95-03				X
		T99-03		X		X
		P92-02		X		X
		P92-03		X		X
		P92-05				X
		P92-06		X	X	X
		P92-09				X
	Burro Canyon	95-02				X
		95-04				X
		92-10				X
	Burro Canyon/Dakota	83-70				X
	Dakota Sandstone	92-12				X
	Montezuma Creek	SW01-01	X	X	X	X
		Sorenson	X	X	X	X
		SW00-04		X		X
		SW92-08		X		X
		SW94-01		X		X

[a] Listed locations and sample requirements are subject to change through Program Directives.

[b] Wells 31NE93-205, 95-06, and 95-07 (not listed above) are discontinued from water level measurements and will be sampled only in the years prior to the CERCLA 5-Year review. The next occurrence will be in October 2005.

The following wells are subject to water level measurements only:

31SW93-197-2	MW00-04	T00-03	T00-12	T01-17
31SW93-197-3	MW00-08	T00-05	T00-13	T01-22
31SW93-197-4	P92-01	T00-06	T00-14	R1-M1
31SW93-197-5	T99-05	T00-07	T00-15	R6-M1
31SW93-200-1	T99-06	T00-08	T01-03	R7-M1
31SW93-200-2	T99-07	T00-09	T01-11	R8-M1
31SW93-200-3	T99-10	T00-10	T01-15	R1-M6
95-08	T00-02	T00-11	T01-16	R6-M6

Attachment 2. Analytical Requirements for OU III Surface Water and Ground Water Samples

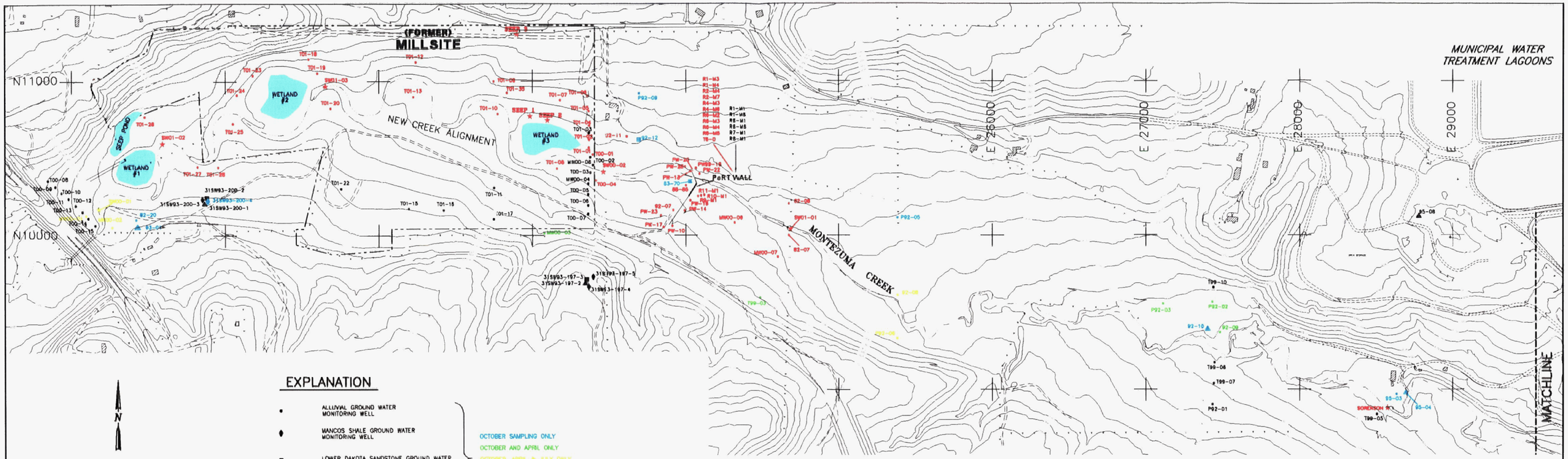
OU III Analytical Parameters, Containers, Preservation, and Holding Times:

Analytical Parameter[1]	Container (Type / Size)	Preservation	Holding Time
Metals (As, Fe, Mn, Mo, Se, U, V)	HDPE 500mL	Filter by 0.45- m filter; HNO_3 to pH<2	6 Months
Major Cations (Ca, Mg, K, and Na) (from the same bottles as Metals)	See Metals		
Major Anions (Cl, F, and SO_4)	HDPE 125 mL	Filter by 0.45- m filter; Cool to 4° C	28 Days
Nitrate + Nitrite (NO_3 + NO_2 as N)	HDPE 125 mL	Filter by 0.45- m filter; Cool to 4° C; H_2SO_4 to pH<2	28 Days
Total Ammonia (NH_3) *(during January only)*[2] (from the same bottles as Nitrate + Nitrite)	See Nitrate + Nitrite		
Gross Alpha/Gross Beta	HDPE 1 L	*Ground Water*: filter by 0.45- m filter; *Surface Water*: unfiltered; HNO_3 to pH<2 (both GW and SW)	6 Months
Total Dissolved Solids (filterable residue)[3] (*Surface Water* only)	HDPE 125 mL	Cool to 4° C	7 Days
Isotopic Uranium (U-234, and U-238)[4] (*Surface Water* only)	HDPE 1 L	(Unfiltered) HNO_3 to pH<2	6 Months

[1] Collect the following samples at the seep locations: metals, cations, anions, nitrate + nitrite (NO_3 + NO_2 as N)
[2] Collect a sample for Total Ammonia (NH_3) analysis from scheduled Monticello Creek sample locations.
[3] Collect a sample for TDS analysis from surface water locations only.
[4] Collect a 1 Liter sample unfiltered for Isotopic Uranium (U-234 and U-238) analyses at all surface water sites.

PeRT Well Analytical Parameters, Containers, Preservation, and Holding Times:

Analyte	Container (Type / Size)	Preservation	Holding Time
Metals (As, Fe, Mn, Mo, Se, U, V)	HDPE 500mL	Filtered by 0.45 µm filter HNO_3 to pH < 2	6 months
Cations (Ca, K, Mg, and Na) (from the same bottle as Metals)	See Metals		
Anions (Cl, F, SO_4)	HDPE 125mL	Filtered by 0.45 µm filter Cool to 4° C	28 days
Nitrate + Nitrite (NO_3 + NO_2 as N)	HDPE 125mL	Filtered by 0.45 µm filter Cool to 4° C H_2SO_4 to pH < 2	28 days



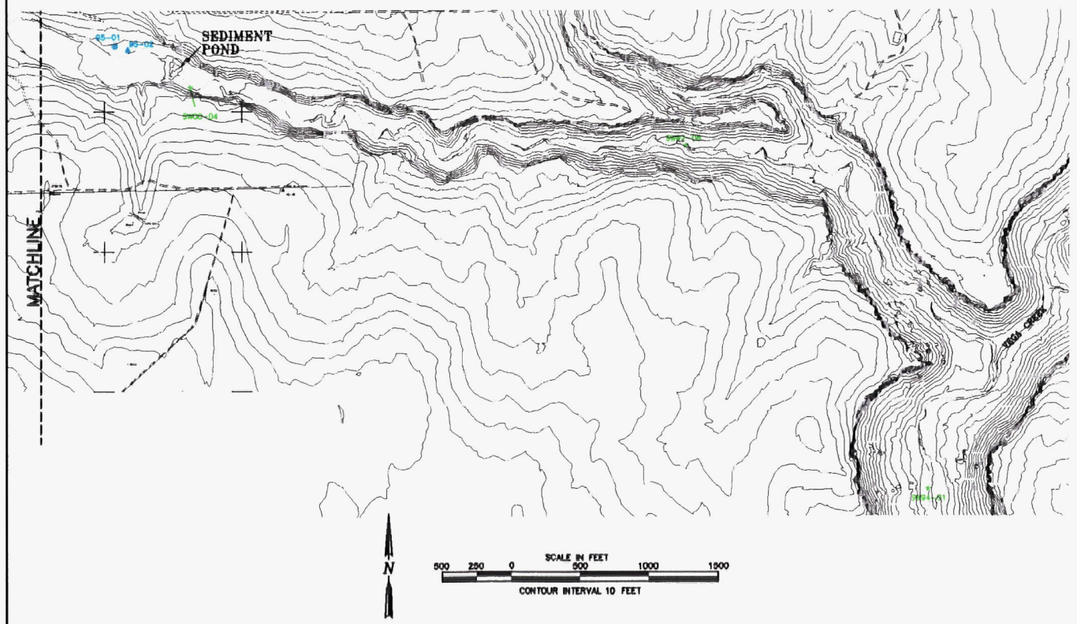
EXPLANATION

- ALLUVIAL GROUND WATER MONITORING WELL
- MANCOS SHALE GROUND WATER MONITORING WELL
- LOWER DAKOTA SANDSTONE GROUND WATER MONITORING WELL
- BURRO CANYON AQUIFER GROUND WATER MONITORING WELL
- SURFACE WATER CHEMISTRY LOCATION
- FORMER MILLSITE BOUNDARY
- NEW WETLAND AREA

OCTOBER SAMPLING ONLY
OCTOBER AND APRIL ONLY
OCTOBER, APRIL & JULY ONLY
ALL EVENTS
SAMPLING DISCONTINUED–WATER LEVEL MEASURED

N

SCALE IN FEET
300 150 0 300 600 900
CONTOUR INTERVAL 10 FEET



SAMPLING LOCATION			IRA ANNUAL MONITORING[a] CY 2002			
General Location	Description	Location ID[b]	January	April	July	October
Former Millsite	Alluvial	92-20				X
		MW00-01		X	X	X
		MW00-02		X	X	X
		MW00-03		X		X
		T00-01	X	X	X	X
		T00-04	X	X	X	X
		T01-01	X	X	X	X
		T01-02	X	X	X	X
		T01-04	X	X	X	X
		T01-05	X	X	X	X
		T01-06	X	X	X	X
		T01-07	X	X	X	X
		T01-08	X	X	X	X
		T01-09	X	X	X	X
		T01-10	X	X	X	X
		T01-12	X	X	X	X
		T01-13	X	X	X	X
		T01-18	X	X	X	X
		T01-19	X	X	X	X
		T01-20	X	X	X	X
		T01-23	X	X	X	X
		T01-24	X	X	X	X
		T01-25	X	X	X	X
		T01-26	X	X	X	X
		T01-27	X	X	X	X
		T01-28	X	X	X	X
		T01-35	X	X	X	X
	Burro Canyon	93-01				X
	Mancos Shale	31SW93-200-4				X
	Montezuma Creek	SW00-01		X	X	X
		SW00-02	X	X	X	X
		SW01-02	X	X	X	X
		SW01-03	X	X	X	X
	Millsite Seeps	Seep 1	X	X	X	X
		Seep 2	X	X	X	X
		Seep 3	X	X	X	X
Downgradient	Alluvial (vicinity of PeRT Wall)	PW-10	X	X	X	X
		PW-14	X	X	X	X
		PW-16	X	X	X	X
		PW-17	X	X	X	X
		PW-18	X	X	X	X
		PW-20	X	X	X	X
		PW-22	X	X	X	X
		PW-23	X	X	X	X
		PW-28	X	X	X	X
		PW99-16	X	X	X	X

SAMPLING LOCATION			IRA ANNUAL MONITORING[a] CY 2002			
General Location	Description	Location ID[b]	January	April	July	October
Downgradient	Alluvial (PeRT wells)	R1-M3	X	X	X	X
		R1-M4	X	X	X	X
		R2-M4	X	X	X	X
		R2-M7	X	X	X	X
		R4-M3	X	X	X	X
		R4-M6	X	X	X	X
		R6-M2	X	X	X	X
		R6-M3	X	X	X	X
		TB-D	X	X	X	X
		R6-M4	X	X	X	X
		R6-M5	X	X	X	X
		R9-M1	X	X	X	X
		R10-M1	X	X	X	X
		R11-M1	X	X	X	X
	Alluvial	MW00-06	X	X	X	X
		MW00-07	X	X	X	X
		82-07	X	X	X	X
		82-08	X	X	X	X
		86-95	X	X	X	X
		92-07	X	X	X	X
		92-08		X	X	X
		92-09		X	X	X
		92-11	X	X	X	X
		95-01				X
		95-03				X
		T99-03		X		X
		P92-02		X		X
		P92-03		X		X
		P92-05				X
		P92-06		X	X	X
		P92-09				X
	Burro Canyon	95-02				X
		95-04				X
		92-10				X
	Burro Canyon/Dakota	83-70				X
	Dakota Sandstone	92-12				X
	Montezuma Creek	SW01-01	X	X	X	X
		Sorenson	X	X	X	X
		SW00-04		X		X
		SW92-08		X		X
		SW94-01		X		X

[a] Listed locations and sample requirements are subject to change through Program Directives.
[b] Wells 31NE93-205, 95-06, and 95-07 (not listed above) are discontinued from water level measurements and will be sampled only in the years prior to the CERCLA 5-Year review. The next occurrence will be in October 2006.

NOTES:
ABANDON UPGRADIENT ALLUVIAL WELL 92-05 DURING NEXT PHASE OF WELL ABANDONMENT.
ABANDON OR TURN WATER RIGHT OVER TO THE CITY OF MONTICELLO FOR UPGRADIENT WELLS 92-01, 92-02, 92-03, 93-04, 92-06, AND 92-13.
ABANDON MILLSITE BEDROCK WELLS 31SW93-200-1, -200-2, AND -200-3 DURING NEXT PHASE OF WELL ABANDONMENT.
ABANDON DOWNGRADIENT ALLUVIAL WELLS P92-01, P92-04, P92-07, T99-06, T99-07, AND T99-10 BECAUSE THEY ARE DRY OR PRODUCE INSUFFICIENT WATER.
ABANDON DOWNGRADIENT ALLUVIAL WELL T99-05, BECAUSE IT PROVIDES DUPLICATE INFORMATION TO WELL 95-03.
ABANDON CROSS-GRADIENT BEDROCK WELLS 31SW93-197-2, -197-3, -197-4, -197-5 DURING NEXT PHASE OF WELL ABANDONMENT.
WATER LEVELS WILL BE MEASURED AT ALL WELL LOCATIONS DURING EACH SAMPLING EVENT. SURFACE WATER FLOW MEASUREMENTS WILL BE FIELD LOCATED IN THE PROXIMITY OF THE SAMPLING LOCATION DEPENDENT ON CURRENT FLOW CONDITIONS.

macTec-ers	U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE GRAND JUNCTION, COLORADO
PLATE 1	WELL AND SURFACE WATER LOCATION MAP
DATE PREPARED: JANUARY 7, 2002	FILENAME: Q0026100

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4-21 (15) OU III AR 576

Program Directive

MMTS–OUIII	**Program/Project**	**Directive No.**	MSG–02–02

Task Order No. MAC02–01 (Task No. 360705012)

Initiated By: Stan Morrison, Task Lead

Directive Subject: Sampling and analysis of zero-valent iron (ZVI) in the Monticello OU III permeable reactive barrier (PRB) to obtain information on its performance.

Background: Accurate predictions of long-term effectiveness of PRBs have been problematic despite the large number (over 50) of installations in the last 5 years. Accurate predictions of long-term effectiveness of the Monticello PRB is needed to compare costs of this remedial technology with other technologies, and to estimate when corrective actions may be needed. Long-term performance is affected by 3 mechanisms: (1) decrease in efficiency due to dissolution of ZVI, (2) passivation of ZVI due to alteration of reactive surfaces, and (3) alteration of the hydrologic regime due to mineral precipitation or any other plugging mechanisms in the PRB. Dissolution of ZVI (Item [1]) can be predicted with some certainty based on groundwater chemistry and does not appear to be a limiting factor for PRB longevity. Water quality samples have been collected quarterly since the PRB was installed and are used to document groundwater chemistry changes. Passivation of ZVI (Item [2]) can also be monitored using groundwater chemistry; for example, increases in pH and decreases in Eh and concentrations of calcium and inorganic carbon across the PRB at a given time are indications that it is functioning properly. The results of monitoring these parameters during an assessment period (usually several years) can be used to help predict future surface passivation effects.

Mineral precipitation (Item [3]) is perhaps the most important cause of PRB loss of longevity and is the most difficult to evaluate. Changes to the hydrologic regime are difficult to measure directly. Flow sensors and tracer tests are too expensive to provide the required distribution of data and have often provided contradictory results at other sites. Groundwater flow analysis based on water level, gradient, and hydraulic conductivity measurements provides information on the general groundwater flow velocity; however, hydraulic conductivity data are rarely available in sufficiently detailed distributions to depict the highly variable velocities that occur in the PRB, and the hydraulic conductivity is changing as the PRB is mineralized.

Groundwater chemistry usually indicates low concentrations of the contaminants of concern (COCs) in the downgradient portion of PRBs but the flux of contamination through the zone is seldom, if ever, known accurately. Tools that have been applied to help evaluate flux include flow sensors (placed in wells or implanted directly in the ZVI or surrounding strata), tracer studies, and water level measurements (coupled with gradient). Results using these methods are often inconsistent and generally incomplete in depicting the flow regime within the PRB.

Minerals are precipitated from groundwater as it moves through PRBs. A newly proposed method to evaluate the performance of PRB uses the distribution of the mineralization left by the groundwater as a means of tracing the historical flow of groundwater. The concentrations of these minerals are directly related to the aqueous concentration gradients and the amount of groundwater that has passed through a specified volume of ZVI over the period of time from installation to sampling. Also, the *distribution* of mineralization reflects the pathways that groundwater has taken.

Justification and Associated New Task Changes: A thorough sampling of the Monticello PRB chemistry (the focus of this study) will provide a detailed depiction of the amount of mineralization and its distribution. Since the aqueous concentration gradients have been reasonably consistent over time, data on the amount of mineralization can be used to estimate the volume of groundwater that has passed through the PRB. Knowing the volume of groundwater for the 2-year evaluation period and the preferred pathways through the PRB to date will help to make predictions of its performance in the future.

This method has been applied at only one other PRB site, an UMTRA site at Durango Colorado (Morrison et al. 2002). The results from that evaluation indicated that considerably less water had been treated than was believed based on flow records (the contaminated water at the Durango site was piped to the PRB and flow was measured with a meter). The results also indicated that the water had taken an unforeseen flow path (a drain pipe had been inadvertently installed during construction which caused the water to short circuit around a portion of the PRB). The assessment of the PRB's performance changed significantly based on the study.

Organizations Affected: OU III Project Team, Environmental Sciences Laboratory personnel, and GJO Analytical Laboratory.

Affected Documents: *MMTS OU III Interim Remedial Action Work Plan for Operable Unit III—Surface Water and Ground Water, October 2000* (MAC–MSG–2.2.1)

Directive: (1) Core samples will be collected from the Monticello PRB using a Geoprobe equipped with a 1-in diameter core barrel. A dual wall sampler may be used to achieve high quality samples. The sampling design consists of a combination of stratified random and discretionary sampling. The stratified random portion of the sampling consists of sixty cores located along 10 transects (perpendicular to the PRB) that are placed randomly along each of 10 sections of the PRB (Figure 1, attached [locations that are on concrete will be randomly offset]; Table 1). Four locations are positioned randomly along the transect within the ZVI zone (Table 2) and two are positioned randomly within the gravel/ZVI zone (Table 3). At each corehole 4 samples will be collected at random depths between the top of the water table and the bedrock surface for a total of 240 samples. An additional 160 discretionary samples (from approximately 40 boreholes) will be collected in areas where sharp concentration gradients are observed during the stratified random sampling (carbonate analysis will be used as a field analysis to guide the locations for some of the additional samples). At least 10 of the discretionary boreholes will be drilled at an angle so that the interfaces between the native

aquifer material and the pretreatment zone and between the pretreatment zone and the 100 percent ZVI are cored (5 coreholes per interface). Thus, a total of 400 samples will be collected.

(2) Each core will be sectioned every 6 in. and appropriate samples retained for analysis. Each core will be identified by transect number, borehole location along the transect (numbered from 1 to 4 beginning at the west end of the transect), and depth. The sample called T1 B1–6 refers to the sample collected beginning at 6 in. below ground surface from borehole 1 on transect 1.

(3) Cores not analyzed will be placed in plastic bags and retained. A log will be generated in the Project Field Notebook listing archived sample bags.

(4) All field notes will be retained in the Project Field Notebook. Entries will be made at each borehole regarding sample recovery, samples submitted to the GJO Analytical Chemistry Laboratory, and samples retained for possible future analysis.

(5) Bulk density will be determined on each sample. To determine bulk density, an exact volume of core will be dried in an oven and weighed.

(6) A split of the dried sample will be used to determine carbonate content by CO_2 outgassing using the GJO Environmental Sciences Laboratory (ESL) procedure AP(CO_3–1) (DOE 1999). The carbonate analyses will be conducted daily so the results will be available to guide discretionary sample collection during the field project.

(7) A second split of the dried sample will be sent to the GJO analytical chemistry laboratory and microwave digested with concentrated nitric acid using GJO Analytical Chemistry Laboratory Procedure L–3 (Wastren 1996). The digestates will be analyzed for U, Ca, and V by the methods listed in Table 4.

(8) Data will be reported in units of mg/kg and density values will be used to convert them to mass per volume. A value of total mass that has been precipitated within the PRB will be estimated for each constituent (Ca, CO_3, U, and V). Using time-averaged concentration gradients from the aqueous samples collected routinely from the PRB during its operation, an estimate of the amount of groundwater that has been treated by the PRB will be made.

(9) Concentration maps will be made to display time-averaged patterns of groundwater flow based on the solid phase concentrations in the PRB. Methods and results will be described in the PeRT wall treatability study report.

Table 1. Locations of Transects

TRANSECTS		Feet From South Boundary
Quadrangle Number	Random Number	
1	0.303561	3.04
2	0.031248	0.31
3	0.093053	0.93
4	0.083953	0.84
5	0.709368	7.09
6	0.918695	9.19
7	0.717292	7.17
8	0.733751	7.34
9	0.377494	3.77
10	0.575409	5.75

Table 2. Locations in ZVI Zone Along Transects

ZVI Transect Number	Random Number	Feet From East Boundary	ZVI Transect Number	Random Number	Feet From East Boundary
1	0.148446	0.59	6	0.134883	0.54
1	0.294814	1.18	6	0.892749	3.57
1	0.577503	2.31	6	0.895226	3.58
1	0.86786	3.47	6	0.221567	0.89
2	0.466273	1.87	7	0.217978	0.87
2	0.479428	1.92	7	0.96845	3.87
2	0.676927	2.71	7	0.357475	1.43
2	0.31198	1.25	7	0.972131	3.89
3	0.165411	0.66	8	0.507276	2.03
3	0.714349	2.86	8	0.16715	0.67
3	0.832701	3.33	8	0.786751	3.15
3	0.167584	0.67	8	0.895693	3.58
4	0.057678	0.23	9	0.812993	3.25
4	0.666343	2.67	9	0.616647	2.47
4	0.363779	1.46	9	0.301883	1.21
4	0.889165	3.56	9	0.006437	0.03
5	0.700464	2.80	10	0.433911	1.74
5	0.472054	1.89	10	0.651483	2.61
5	0.2549	1.02	10	0.427629	1.71
5	0.582927	2.33	10	0.951221	3.80

Table 3. Locations in Gravel/ZVI Along Transects

Gravel/ZVI Transect Number	Random Number	Feet From East Boundary
1	0.718274	1.44
1	0.911378	1.82
2	0.852387	1.70
2	0.500528	1.00
3	0.899468	1.80
3	0.881935	1.76
4	0.696868	1.39
4	0.147462	0.29
5	0.437161	0.87
5	0.567301	1.13
6	0.675264	1.35
6	0.981564	1.96
7	0.152924	0.31
7	0.07503	0.15
8	0.080128	0.16
8	0.146113	0.29
9	0.184077	0.37
9	0.028984	0.06
10	0.866332	1.73
10	0.458253	0.92

Table 4. Analytical Methods

Analyte	GJO Chemistry Laboratory Procedure	Description
Ca	AS–5 Rev 06	ICP–AES
U	AS–6 Rev 06	IC–MS
V	AS–5 Rev 06	ICP–AES

ICP–AES = Inductively Coupled Plasma - Atomic Emission Spectroscopy
ICP–MS = Inductively Coupled Plasma - Mass Spectrometry

Review and Concurrence:

Kristen McClellen, OU III Project Manager

Farlie Pearl, QA Consultant

Task Order Manager Approval to Issue:

Mike Butherus, Manager, Major Project

Effective Date: February 1, 2002 **Expiration Date:** May 1, 2002

Distribution

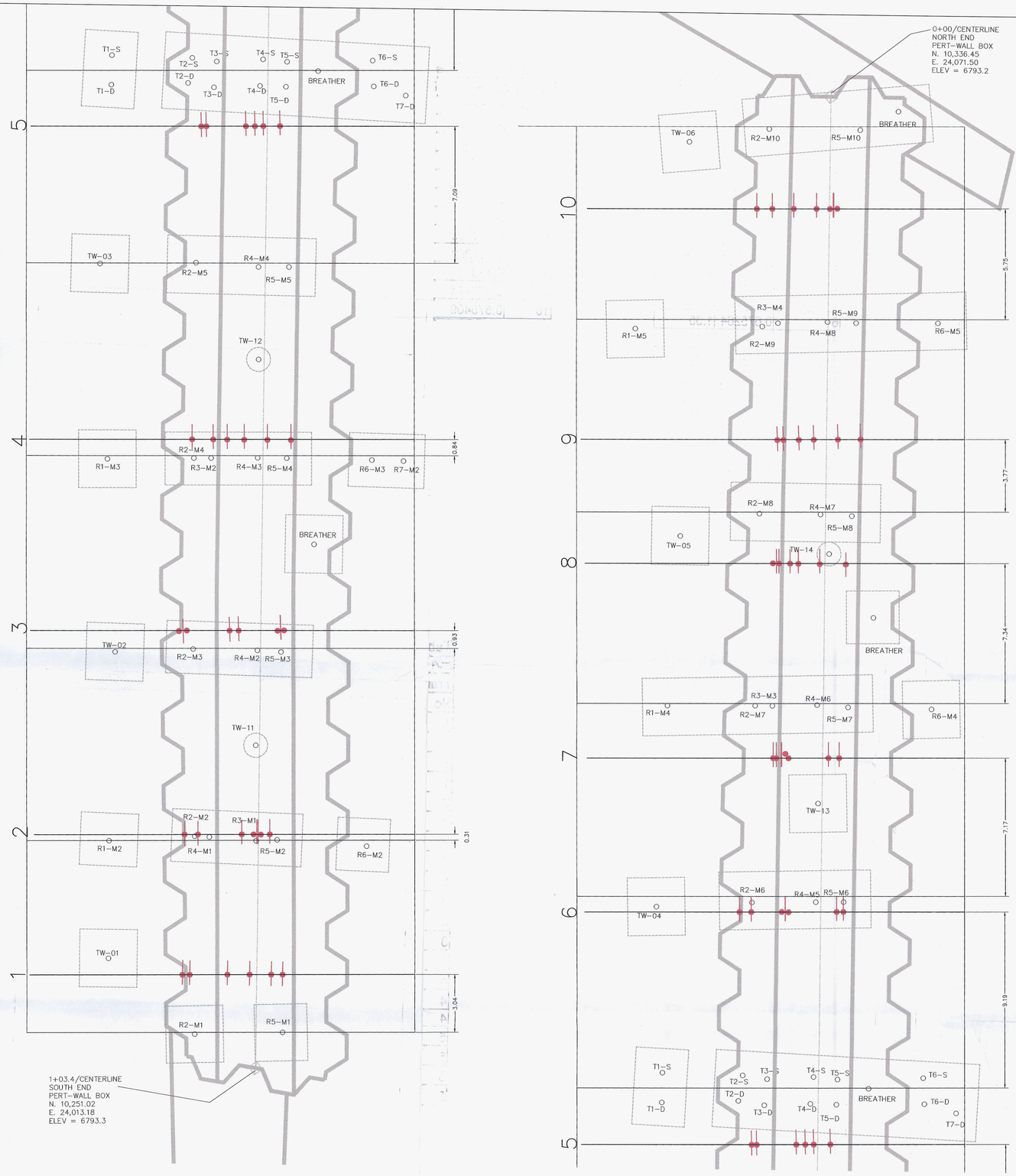
Task Order Managers Directive Log
Jalane Glasgow—Record File
Holders of affected documents
Tom Kirkpatrick (2 copies)—Project Administrative Record

References:

DOE 1999. Environmental Sciences Laboratory Procedures Manual, MAC-3017.

Morrison, S.J., Metzler, D.R., and Dwyer, B.P. 2002 (in press). Collection drain and permeable reactive barrier for treating uranium and metals from mill tailings near Durango, Colorado, in D.L.Naftz, D.L., Morrison, S.J., Fuller, C.C., Davis, J.A. (eds), Groundwater Remediation of Metals, Radionuclides, and Nutrients, with Permeable Reactive Barrier, Academic Press.

WASTREN, 1996. *Analytical Chemistry Laboratory Handbook of Analytical and Sample-Preparation Procedures*, prepared for the U.S. Department of Energy Grand Junction Office.



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5	0.582927	2.33	10	0.951221	3.80

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U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION OFFICE
GRAND JUNCTION, COLORADO

SAMPLING AND ANALYSIS FOR ZVI

DATE PREPARED: FEBRUARY 7, 2002

FILENAME: Q0026200

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4-21 (16) OU III AR 576

Program Directive

Monticello MSG/OU III, Annual Monitoring **Program/Project** **Directive No.** MSG-02-03

Task Order and Task No. ST03-105 / 110505008 .

Initiated By: Farlie Pearl, Program Integration QA .
(Name and Organization)

Department/Groups Affected: Field sampling personnel and GJO Analytical Laboratory

Affected Documents: MMTS, OUIII, Interim Remedial Action Surface Water and Ground Water Monitoring Plan, Rev. 4, January 2001 (MAC-MSGRAP 1.3.5-1) and Program Directive MSG 02-01 1/21/02 through 10/31/02.

Directive Subject: Revised Ground Water and Surface Water monitoring locations, Surface Water analyte list, and water level measurements for wells that have been purged dry.

Justification and Associated New Task Changes:
1. Changes to sample locations and analytes: Agreements reached with DOE and the regulators (UDEQ and EPA) during the May 14, 2002 OUIII technical meeting, and August 27, 2002 FFA meeting regarding sampling locations and analytes.

2. Additionally, as of October 2001 the PeRT gate performance monitoring and associated wells fell under the management of the OU III project. Review of the first two years worth of monitoring data indicated that the gate was performing as expected and that the intensity of monitoring could be scaled back. After an additional year's worth of data were reviewed, it was decided additional locations in the gravel/ZVI zone should be monitored.

Directive: This directive and the attachments supersede and cancel Directive MSG 02-01. The following additional direction is given through this directive.

General:

1. At the direction of DOE, Program Directives will continue to be used to direct field activities, affect changes to the Annual Monitoring Plan and implement technical direction resulting from meetings between DOE and regulators.
2. Attachment 1 identifies locations, field parameters, analytes, preservation and relevant field notes. This table will be affixed into each field book used during a sampling event. Additionally, it will be updated before each event to tailor the locations, analytes, etc. as appropriate to the sampling event.

Ground Water (all wells, including PeRT):

1. To the extent possible purge and sample all wells using low-flow techniques
2. For wells that have been purged dry, a sample may be collected provided the following water level criteria has been met: When returning to collect a sample from wells that have been purged dry and or have poor recovery, revisit the well (allow a minimum of 2 hours or wait until the next day) and re-measure and record the WL. If the level has not returned to 75% of the original measured WL do not collect a sample. If the level exceeds the 75%, collect what sample you can, according to the following priority list; metals, nitrate/nitrite, anions, gross alpha/gross beta. Do not return time and again to try to collect sufficient volume for partial or full samples.
3. Discontinue sampling at P92-03 and T99-03. Continue to collect water level measurements at these locations.

Ground Water (PeRT Wells)

1. Obtain water level measurements and samples at PeRT well locations as listed in Attachment 2
2. Collect metals, cation, and anion samples filtered at sampled PeRT well locations
3. Measure alkalinity filtered at sampled PeRT well locations

Directive (continued)

Surface Water

1. Collect four samples from Wetland 3 at the approximate locations shown on the *Well and Surface Water Sample Location Map* in Attachment 3.
2. Collect a sample for Total Ammonia (NH_4 as N) from the four Wetland 3 locations and all scheduled Monticello Creek sample locations.

Attachments:

Attachment 1: Monticello OU III October 2002 Sample and Measurement Locations
Attachment 2: PeRT Well Sample and Measurement Locations
Attachment 3: Well and Surface Water Location Map

Review and Concurrence:

Dan Capdell FOR JP — 9-26-02
Jeff Price, Field Supervisor — Date

Donna J. Riddle — Sept. 17, 2002
Donna Riddle, QA Manager — Date

T Bartlett — 9/17/02
Tim Bartlett, Project Hydrologist — Date

Effective Date: September 30, 2002 **Expiration Date**: October 31, 2002

Task Order Manager Approval to Issue:

Kristen L. McClellen — 9/26/02
Kristen McClellen, Task Order Manager — Date

Distribution: (w/ attachments)
Program Directive Log
Jalane GLasgow - Record File MRAP 1.3.5
Tom Kirkpatrick - MSG Administrative Record (2 copies)
Holders of MAC-MSGRAP 1.3.5-1

Program Directive MSG 02-03 – Attachment 1
Monticello OU III Sample and Measurement Locations

Location No.	Total Depth[a]	Depth to Water[a]	Casing Diameter	Sample Method[b]	Analytes and General Notes	Comments
Monticello OU III Monitor Wells — FILTERED						
82-20	24.70	19.41	2	Submersible	FIELD Temperature, Conductivity, pH, Turbidity, and Alkalinity LABORATORY **1 - 1L HDPE:** Gross Alpha / Gross Beta *Preservative:* HNO_3 pH <2 **1 - 500 mL Amber HDPE:** (Metals) As, Fe, Mn, Mo, Se, U, V and (Cations) Ca, Mg, K, Na *Preservative:* HNO_3 pH <2 **1 - 125 mL HDPE:** (Anions) Cl, F, SO_4 *Preservative:* cool 4° C **1 - 125 mL HDPE:** (Nitrate/Nitrite) $NO_3 + NO_2$ as N *Preservative:* H_2SO_4 pH < 2, Cool 4° C NOTES 1. ***DO NOT*** collect extra volume for lab QA/QC, it is not required for this project. 2. **QA/QA Sample Numbers:** *GW:* The numbering for GW QA samples (including PeRT Wells) is 80-xx. *SW:* The numbering for SW QA samples (including Seeps) is SW80-xx. Assign a time 5 – 10 minutes from the true sample time 3. GW **Turbidity** criteria is **< 5 NTUs.** Turbidity measurements are not required for surface locations 4. **Sample collection priority** for wells with poor well recovery is metals, nitrate/nitrite, anions, gross alpha /gross beta 5. See Program Directive MSG 02-03 for guidance on WL measurements and sample collection from **wells with poor recovery.**	
93-01	179.90	110.51	4	BP		
31SW93-200-4	12.77	5.53	2	DT Peristaltic		
MW00-01	16.16	11.47	2	DT Peristaltic		
MW00-02	16.07	12.55	2	DT Peristaltic		
MW00-03	14.65	13.32	2	DT Peristaltic		
T00-01	12.25	9.70	1	DT Peristaltic		
T00-04	8.35	7.41	1	DT Peristaltic		**10/02 Replace dedicated tubing before sampling**
T01-01	10.40	9.23	1	DT Peristaltic		.07L/min purge rate – NTUs not met
T01-02	11.9	9.67	1	DT Peristaltic		
T01-04	17.25	14.70	1	DT Peristaltic		↑ NTU – purged 6L in 45 min to meet criteria
T01-05	24.38	21.00	1	DT Peristaltic		
T01-06	25.34	Dry	1	DT Blue pump		
T01-07	22.63	19.90	1	DT Peristaltic		
T01-08	7.98	4.48	1	DT Peristaltic		dry @ 600ml-partial smpl
T01-09	19.21	Dry	1	DT Peristaltic		
T01-10	8.29	Dry	1	DT Peristaltic		
T01-12	23.70	20.59	1	DT Peristaltic		
T01-13	11.62	6.76	1	DT Peristaltic		dry @ 1.5 L- part sample
T01-18	21.83	19.75	1	DT Peristaltic		dry @ .5L - no recovery
T01-19	12.42	10.00	1	DT Peristaltic		dry @ 1L - partial sample
T01-20	16.50	12.37	1	DT Peristaltic		dry @ .75L -part sample
T01-23	14.40	12.50	1	DT Peristaltic		
T01-24	9.81	Dry	1	DT Peristaltic		
T01-25	14.32	10.84	1	DT Peristaltic		dry @ .9L-partial sample
T01-26	21.08	19.35	1	DT Peristaltic		Purged 8.5L in 30 min to meet NTUs
T01-27	7.06	2.25	1	DT Peristaltic		dry @ 1.5L part sample
T01-28	5.13	Dry	1	DT Peristaltic		dry @ 200ml-partial smpl
T01-35	14.80	12.30	1	DT Peristaltic		
PW-10	33.02	31.74	1	Bailer/P-pump		Bailed 2 L -Partial sample
PW-14	19.15	18.25	1	DT Peristaltic		Insuf H_2O – no sample
PW-16	15.06	13.00	1	DT Peristaltic		
PW-17	35.84	33.51	1	Bailer/Pump		Bailed 2L – high NTUs
PW-18	11.95	10.03	1	DT Peristaltic		
PW-20	15.80	13.27	1	DT Peristaltic		
PW-22	16.88	11.90	1	DT Peristaltic		
PW-23	24.35	23.50	1	DT Peristaltic		.25L in 20 min – part sample
PW-28	14.45	10.48	1	DT Peristaltic		
PW99-16	16.60	13.60	3/4	DT Peristaltic		

Program Directive MSG 02-03 – Attachment 1
Monticello OU III Sample and Measurement Locations

Location No.	Total Depth[a]	Depth to Water[a]	Casing Diameter	Sample Method[b]	Analytes and General Notes	Comments
MW00-06	19.12	16.81	2	DT Peristaltic	FIELD Temperature, Conductivity, pH, Turbidity, and Alkalinity (include DO & ORP at locations 88-85, 92-07 and 92-11) LABORATORY **1 - 1L HDPE:** Gross Alpha / Gross Beta *Preservative:* HNO_3 pH <2 **1 - 500 mL Amber HDPE:** (Metals) As, Fe, Mn, Mo, Se, U, V and (Cations) Ca, Mg, K, Na *Preservative:* HNO_3 pH <2 **1 - 125 mL HDPE:** (Anions) Cl, F, SO_4 *Preservative:* cool 4° C **1 - 125 mL HDPE:** (Nitrate/Nitrite) $NO_3 + NO_2$ as N *Preservative:* H_2SO_4 pH < 2, Cool 4° C See Notes on previous page re: - QA/QC volumes - NTU criteria - QA/QC Sample IDs - Sample collection prioritization - Well recovery/sampling information	
MW00-07	22.15	21.70	2	DT Peristaltic		Dry @ 1L no recovery
82-07	14.20	Dry	2	BP		
82-08	19.10	13.22	2	DT Peristaltic		
83-70	164.40	39.93	4	BP		
88-85	12.00	6374	2	DT Peristaltic		DATALOGGER (minitrol) Field: OPR, DO also
92-07	21.35	16.88	2	DT Peristaltic		Field: OPR, DO also
92-08	20.70	13.71	2	DT Peristaltic		
92-09	18.50	12.70	2	DT Peristaltic		
92-10	67.30	14.27	4	BP		
92-11	21.28	18.91	2	DT Blue pump		Field: OPR, DO also
92-12	62.30	51.91	4	Bailer		
P92-02	22.61	14.82	2	DT Peristaltic		
P92-05	9.60	5.65	2	DT Peristaltic		
P92-06	16.80	13.35	2	DT Peristaltic		
P92-09	15.32	Dry	2	DT Peristaltic		
95-01	12.30	5.72	2	DT Peristaltic		
95-02	35.50	4.15	4	Submersible		
95-03	13.10	3.91	2	DT Peristaltic		
95-04	38.00	4.54	4	Submersible		
Monticello OU III Monitor Wells (PeRT Wells) — FILTERED						
R1-M3	13.90	4.86	1	DT Peristaltic	FIELD Temperature, Conductivity, pH, ORP, DO, Turbidity, and Alkalinity LABORATORY **1- 500 mL Amber HDPE** (Metals) As, Fe, Mn, Mo, Se, U, V and (Cations) Ca, Mg, K, Na *Preservative:* HNO_3 pH <2 **1 - 125 mL HDPE** (Anions) Cl, F, SO_4 *Preservative:* cool 4° C **1 - 125 mL HDPE** (Nitrate/Nitrite) $NO_3 + NO_2$ as N *Preservative:* H_2SO_4 pH < 2, Cool 4° C	
R1-M4	13.77	4.97	1	DT Peristaltic		
R2-M4	14.42	5.38	1	DT Peristaltic		
R2-M7	13.70	5.31	1	DT Peristaltic		
R3-M2[a]	14.32	6.53	1	DT Peristaltic		
R3-M3[a]	13.65	6.52	1	DT Peristaltic		Note: T6-D went dry@ 1L but recovered **pH is generally @ or < 7** at wells R1-M3, R1-M4, R2-M4, R2-M7, R6-M3, R9-M1, R10-M1 & R11-M1
R4-M3	14.34	5.27	1	DT Peristaltic		
R4-M6	13.76	5.21	1	DT Peristaltic		
R6-M2	14.67	6.97	1	DT Peristaltic		
R6-M3	13.23	9.05	1	DT Peristaltic		
T6-D	13.55	8.68	1	DT Peristaltic		
R6-M4	13.32	7.95	1	DT Peristaltic		
R6-M5	12.37	6.64	1	DT Peristaltic		
R9-M1	14.48	13.80	1	DT Peristaltic		
R10-M1	15.09	12.93	1	DT Peristaltic		
R11-M1	14.51	12.51	1	DT Peristaltic		

Program Directive MSG 02-03 – Attachment 1
Monticello OU III Sample and Measurement Locations

Location No.	Total Depth[a]	Depth to Water[a]	Casing Diameter	Sample Method[b]	Analytes and General Notes	Comments
Seep Locations (former Millsite) — FILTERED (pH typically > 7.0)						
Seep 1	N/A	N/A	N/A	Peristaltic pump	FIELD Temperature, Conductivity, pH, and Alkalinity LABORATORY **1 - 500 mL Amber HDPE:** (Metals) As, Fe, Mn, Mo, Se, U, V and (Cations) Ca, Mg, K, Na *Preservative:* HNO_3 pH <2 **1 - 125 mL HDPE:** (Anions) Cl, F, SO_4 *Preservative:* cool 4° C **1 - 125 mL HDPE:** (Nitrate/Nitrite) $NO_3 + NO_2$ as N *Preservative:* H_2SO_4 pH < 2, Cool 4° C	
Seep 2	N/A	N/A	N/A			
Seep 3	N/A	N/A	N/A			
Surface Water Locations — FILTERED and UNFILTERED (pH typically > 7.0)						
W3-01	N/A	N/A	N/A	Filtered: Peristaltic pump Unfiltered: Dip if possible or pump unfiltered Do not collect sample if flow is not obvious	FIELD Temperature, Conductivity, pH, and Alkalinity LABORATORY **Filtered** **1 - 500 mL Amber HDPE:** (Metals) As, Fe, Mn, Mo, Se, U, V and (Cations) Ca, Mg, K, Na *Preservative:* HNO_3 pH <2 **1 - 125 mL HDPE:** (Anions) Cl, F, SO_4 *Preservative:* cool 4° C **1 - 125 mL HDPE:** (Nitrate/Nitrite) $NO_3 + NO_2$ as N and (Total Ammonia) NH_4 as N *Preservative:* H_2SO_4 pH < 2, Cool 4° C **Unfiltered** **1 - 1L HDPE:** Gross Alpha / Gross Beta *Preservative:* HNO_3 pH <2 **1 - 1L HDPE:** U-243 and U-238 *Preservative:* HNO_3 pH <2 **1 - 125 mL HDPE:** TDS *Preservative:* cool 4° C	No Surface Water samples were collected or stream flow measurements were obtained in July 2002 - All locations were dry or had insufficient flow.
W3-02	N/A	N/A	N/A			
W3-03	N/A	N/A	N/A			
W3-04	N/A	N/A	N/A			
SW00-01	N/A	N/A	N/A			
SW01-02	N/A	N/A	N/A			
SW01-03	N/A	N/A	N/A			
SW00-02	N/A	N/A	N/A			
SW01-01	N/A	N/A	N/A			
Sorenson	N/A	N/A	N/A			
SW00-04	N/A	N/A	N/A			
SW92-08	N/A	N/A	N/A			
SW94-01	N/A	N/A	N/A			

[a] 7/02 measurements except R3-M2 and R3-M3 which were obtained 7/01

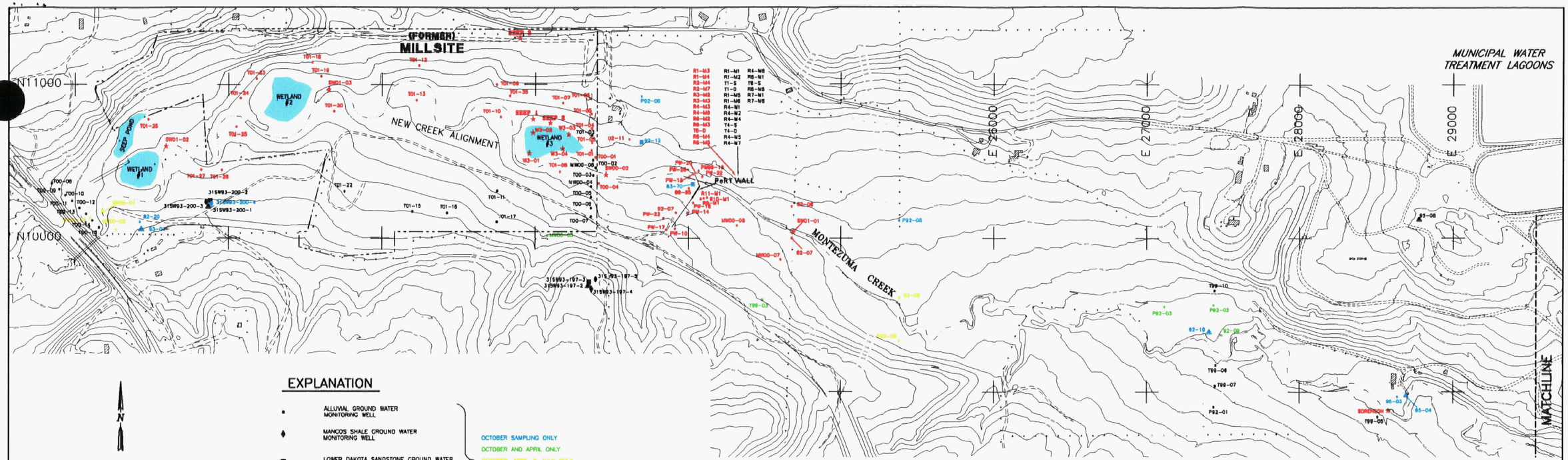
[b] DT = dedicated tubing, BP = installed bladder pump

The following wells are subject to water level measurements only:

31SW93-197-2	31SW93-200-3	T99-03	T00-02	T00-08	T00-13	T01-15	R1-M6
31SW93-197-3	MW00-04	T99-05	T00-03	T00-09	T00-14	T01-16	R6-M1
31SW93-197-4	MW00-08	T99-06	T00-05	T00-10	T00-15	T01-17	R6-M6
31SW93-197-5	P92-01	T99-07	T00-06	T00-11	T01-03	T01-22	R7-M1
31SW93-200-1	P92-03	T99-10	T00-07	T00-12	T01-11	R1-M1	R8-M1
31SW93-200-2	95-08						

Program Directive MSG 02-03 – Attachment 2
PeRT Well Sample and Measurement Locations

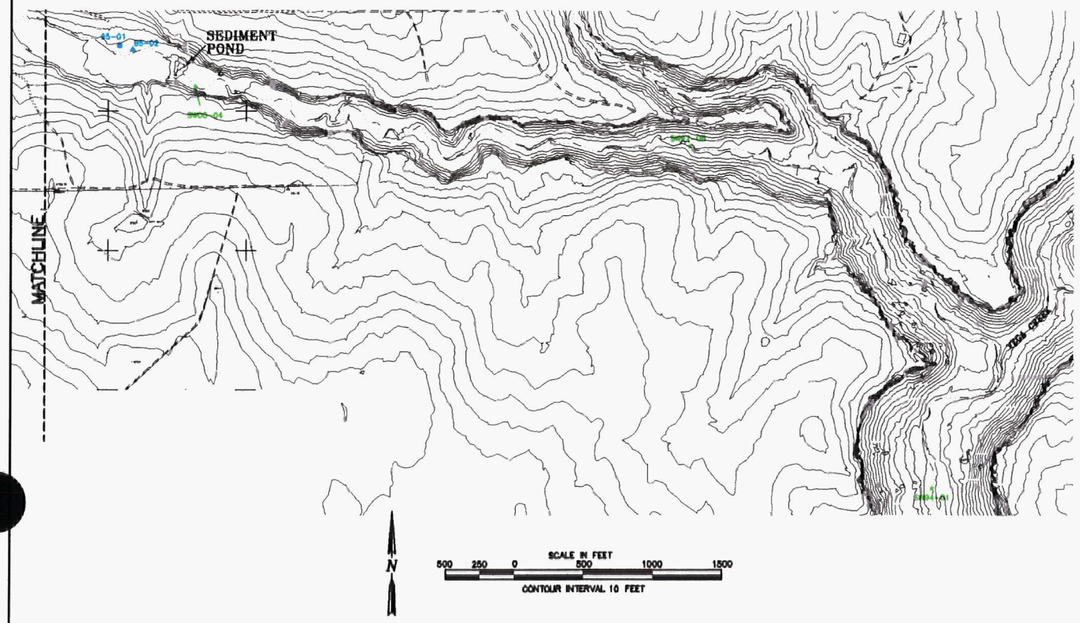
Location	Sample	Water Level	Location	Sample	Water Level
R1-M1		X	R4-M5		X
R1-M2		X	R4-M6	X	X
R1-M3	X	X	R4-M7		X
T1-S		X	R4-M8		X
T1-D		X	R6-M1		X
R1-M4	X	X	R6-M2	X	X
R1-M5		X	R6-M3	X	X
R1-M6		X	T6-S		X
R2-M4	X	X	T6-D	X	X
R2-M7	X	X	R6-M4	X	X
R3-M2	X	X	R6-M5	X	X
R3-M3	X	X	R6-M6		X
R4-M1		X	R7-M1		X
R4-M2		X	R8-M1		X
R4-M3	X	X	R9-M1	X	X
R4-M4		X	R10-M1	X	X
T4-S		X	R11-M1	X	X
T4-D		X			



EXPLANATION

- ALLUVIAL GROUND WATER MONITORING WELL
- MANCOS SHALE GROUND WATER MONITORING WELL
- LOWER DAKOTA SANDSTONE GROUND WATER MONITORING WELL
- BURRO CANYON AQUIFER GROUND WATER MONITORING WELL
- SURFACE WATER CHEMISTRY LOCATION
- FORMER MILLSITE BOUNDARY
- NEW WETLAND AREA

OCTOBER SAMPLING ONLY
OCTOBER AND APRIL ONLY
OCTOBER, APRIL & JULY ONLY
ALL EVENTS
SAMPLING DISCONTINUED–WATER LEVEL MEASURED



SAMPLING LOCATION			IRA ANNUAL MONITORING[a] CY 2002			
General Location	Description	Location ID[b]	January	April	July	October
Former Millsite	Alluvial	92-20				X
		MW00-01		X	X	X
		MW00-02		X	X	X
		MW00-03		X		X
		T00-01	X	X	X	X
		T00-04	X	X	X	X
		T01-01	X	X	X	X
		T01-02	X	X	X	X
		T01-04	X	X	X	X
		T01-05	X	X	X	X
		T01-06	X	X	X	X
		T01-07	X	X	X	X
		T01-08	X	X	X	X
		T01-09	X	X	X	X
		T01-10	X	X	X	X
		T01-12	X	X	X	X
		T01-13	X	X	X	X
		T01-18	X	X	X	X
		T01-19	X	X	X	X
		T01-20	X	X	X	X
		T01-23	X	X	X	X
		T01-24	X	X	X	X
		T01-25	X	X	X	X
		T01-26	X	X	X	X
		T01-27	X	X	X	X
		T01-28	X	X	X	X
		T01-36	X	X	X	X
	Burro Canyon	93-01				X
	Mancos Shale	31SW93-200-4				X
	Montezuma Creek	SW00-01		X	X	X
		SW00-02	X	X	X	X
		SW01-02	X	X	X	X
		SW01-03	X	X	X	X
	Millsite Seeps	Seep 1	X	X	X	X
		Seep 2	X	X	X	X
		Seep 3	X	X	X	X
Downgradient	Alluvial (vicinity of PeRT Wall)	PW-10	X	X	X	X
		PW-14	X	X	X	X
		PW-16	X	X	X	X
		PW-17	X	X	X	X
		PW-18	X	X	X	X
		PW-20	X	X	X	X
		PW-22	X	X	X	X
		PW-23	X	X	X	X
		PW-28	X	X	X	X
		PW99-16	X	X	X	X

SAMPLING LOCATION			IRA ANNUAL MONITORING[a] CY 2002			
General Location	Description	Location ID[b]	January	April	July	October
Downgradient	Alluvial (PeRT walls)	R1-M3	X	X	X	X
		R1-M4	X	X	X	X
		R2-M4	X	X	X	X
		R2-M7	X	X	X	X
		R4-M3	X	X	X	X
		R4-M6	X	X	X	X
		R6-M2	X	X	X	X
		R6-M3	X	X	X	X
		T6-0	X	X	X	X
		R6-M4	X	X	X	X
		R6-M5	X	X	X	X
		R9-M1	X	X	X	X
		R10-M1	X	X	X	X
		R11-M1	X	X	X	X
	Alluvial	MW00-06	X	X	X	X
		MW00-07	X	X	X	X
		92-07	X	X	X	X
		92-08	X	X	X	X
		99-05	X	X	X	X
		92-07	X	X	X	X
		92-08		X	X	X
		92-09		X		X
		92-11	X	X	X	X
		95-01				X
		95-03				X
		T99-03		X		X
		P92-02		X		X
		P92-03		X		X
		P92-05				X
		P92-06		X	X	X
		P92-09				X
	Burro Canyon	95-02				X
		95-04				X
		92-10				X
	Burro Canyon/Dakota	93-70				X
	Dakota Sandstone	92-12				X
	Montezuma Creek	SW01-01	X	X	X	X
		Soranson	X	X	X	X
		SW00-04		X		X
		SW92-08		X		X
		SW94-01		X		X

[a] Listed locations and sample requirements are subject to change through Program Directives.
[b] Wells 31NE93-205, 95-05, and 95-07 (not listed above) are discontinued from water level measurements and will be sampled only in the years prior to the CERCLA 5-Year review. The next occurrence will be in October 2005.

NOTES:
ABANDON UPGRADIENT ALLUVIAL WELL 92-05 DURING NEXT PHASE OF WELL ABANDONMENT.
ABANDON OR TURN WATER RIGHT OVER TO THE CITY OF MONTICELLO FOR UPGRADIENT WELLS 92-01, 92-02, 92-03, 92-04, 92-06, AND 92-13.
ABANDON MILLSITE BEDROCK WELLS 31SW93-200-1, -200-2, AND -200-3 DURING NEXT PHASE OF WELL ABANDONMENT.
ABANDON DOWNGRADIENT ALLUVIAL WELLS P92-01, P92-04, P92-07, T99-06, T99-07, AND T99-10 BECAUSE THEY ARE DRY OR PRODUCE INSUFFICIENT WATER.
ABANDON DOWNGRADIENT ALLUVIAL WELL T99-05, BECAUSE IT PROVIDES DUPLICATE INFORMATION TO WELL 95-03.
ABANDON CROSS-GRADIENT BEDROCK WELLS 31SW93-197-2, -197-3, -197-4, -197-5 DURING NEXT PHASE OF WELL ABANDONMENT.
WATER LEVELS WILL BE MEASURED AT ALL WELL LOCATIONS DURING EACH SAMPLING EVENT. SURFACE WATER FLOW MEASUREMENTS WILL BE FIELD LOCATED IN THE PROXIMITY OF THE SAMPLING LOCATION DEPENDENT ON CURRENT FLOW CONDITIONS.

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE GRAND JUNCTION, COLORADO	Work Performed by S. M. Stoller Corporation Under DOE Contract No. DE-AC13-02GJ79491

PLATE 1 WELL AND SURFACE WATER LOCATION MAP
(Program Directive MSG 02-03-Attachment 3)

DATE PREPARED: SEPTEMBER 16, 2002	FILENAME: Q0026100

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MSG Program Directive MSG 02-03
September 27, 2002

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